

# S.A.E. *Journal*

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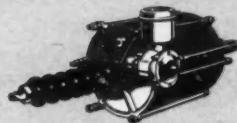
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# TRAINING MILITARY TECHNICIANS

*\$20,000,000 School System at Fort Knox is Training Soldiers to Maintain, Repair, and Fight with Tanks and Armored Vehicles.*

*"Human Production Line" is on Multiple-Shift to Give Tough Courses, in Three Stages, to Officers and Soldiers.*

by BRIGADIER-GENERAL  
STEPHEN G. HENRY

Commandant, Armored Force School

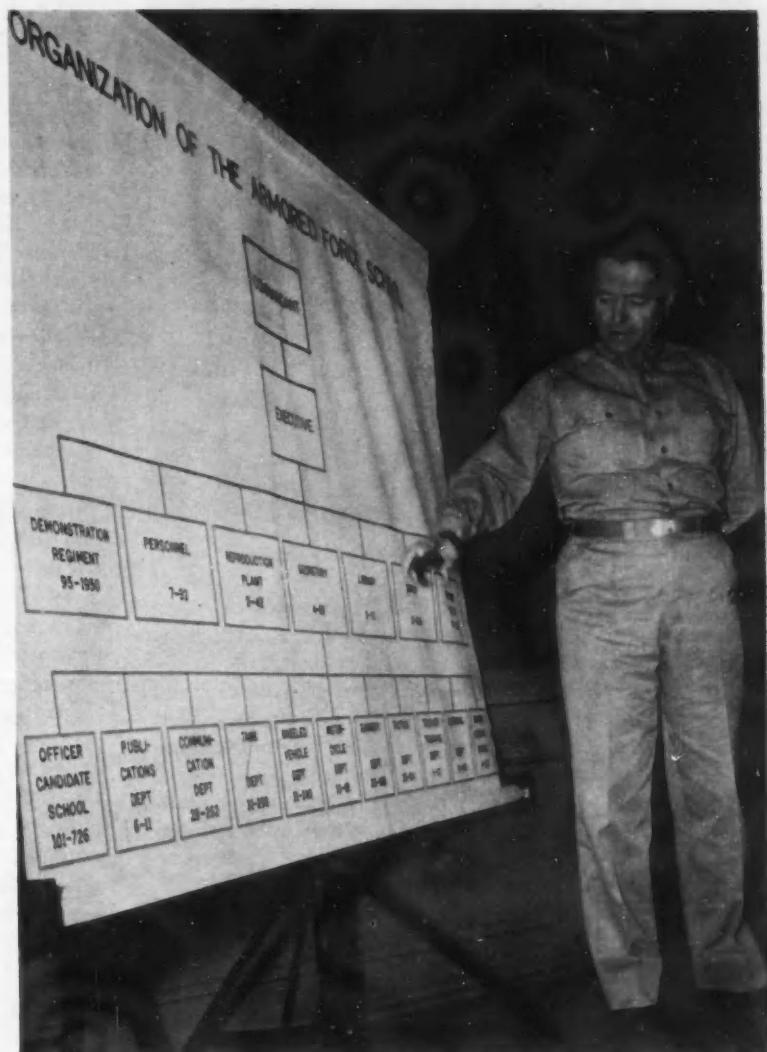
WHEELS and wings have assumed greater importance than horses' hoofs and men's soles. At the Armored Force School we teach our men that a sick tank never takes care of itself. Although it may have been simpler to care for a horse, warfare itself in those days was simpler, and the needs of today are the needs of mechanization and of men who understand mechanization.

Just as important as the machines of war are the men who man the machines behind the machines of war. And so we must have machine-trained men who are skilled in the art of repairing tanks, half-tracks, scout cars, motorcycles—all the vehicles of our new Armored Force. Our Armored Force School teaches these men specialized maintenance as it will be performed on the field of battle.

It was in July, 1940, that this hard-hitting, lightning-fast new Armored Force arm was formed. Quickly it was directed that an Armored Force School be established to train the thousands of technicians we would need to man the fast-forming new armored divisions which were to follow.

In effect, the Armored Force is successor to the old Tank Corps and the more recent Mechanized Cavalry. By name, the Tank Corps passed out of existence in 1923 when tanks

[This paper was presented before the Junior Student Session, SAE War Engineering Production Meeting (Annual Meeting), Detroit, Mich., Jan. 11, 1943.]

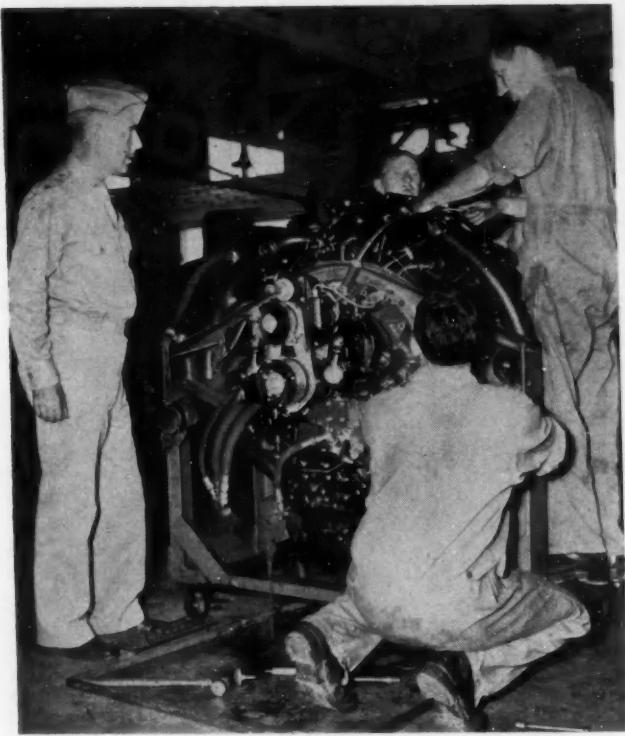


General Henry explaining details of the Armored Force School's organization

became a part of Infantry. In some quarters the misnomer still persists.

From land where only blackberry patches and scrub-growth thrived, has grown one of the largest technical schools in the world. A gigantic task lay before us. There were buildings to build, instructors to find, and students to be brought in and trained. As in the case of any project of this sort, we were feeling our way at first, discarding and trying idea after idea until we drew the institution into the focus in which we wanted it.

To those of you who think only of the gold under the clay of Fort Knox (the gold is still there, but we don't get to see any of it), I might say that the Armored Force



Armored Force colonel supervises work on aircooled tank engine

School now comprises more than 500 buildings, with more than 50 of them used for instructional purposes alone. By careful use of Government funds, we were able to build this mammoth unit at a cost of only \$20,000,000. That figure includes an outlay of as much as a half million dollars alone for some of the structures with their heavy equipment.

We have some 250 officers and more than 2000 enlisted men assigned to teaching. Each has his part in keeping our human assembly line rolling, which operates much as do the Chrysler Tank Arsenal, General Motors, Ford, or any of the mighty factories which are roaring full-blast in Detroit.

Actually, much of being a soldier nowadays is going to school. Soldier students in the Armored Force School take a tank mechanic's course which in civil life might cost them from \$1500 to \$2000 if they had to dig down into their own pockets. Our motorcycle mechanics are being given a \$500 course.

This Motorcycle Department is the largest motorcycle mechanics' school in the United States. Our Communication Department ranks with the Signal Corps School. We have what are thought to be the two largest indoor gunnery ranges in the world, and our Clerical Department could absorb several average-size civilian business colleges.

If you were to start attending all the schools of the Army, taking their several courses, I dare say you would be going to class most of the rest of your lives. The Army is careful about training the men it throws into battle.

We like to think that many of the courses in the Armored Force School are of more than wartime value. When peace comes our tank mechanics, for example, will be qualified as airplane mechanics in the vast aircraft industry, which probably will be the fastest expanding business in the world. Tank and airplane engines are similar. Moreover, the man who was a farmer before the war will have two jobs he can do after it. The young man who was a shoe clerk may prefer to become a motorcycle mechanic after the war. In those respects, the Army's educational program is far-reaching.

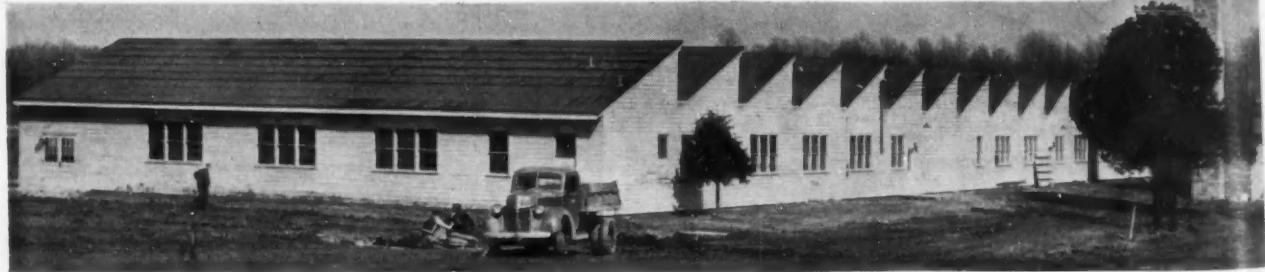
In the Armored Force School our soldier students on the first shift march into the classroom at six a. m. Those on the second shift march into classrooms and shops at one p. m., just as those on the first shift are marching out.

The soldier of World War II goes to school so that he may be better trained than his Axis adversaries. Throughout the school we have posted this axiom: "LEARN NOW SO THAT YOU WILL LIVE LATER."

That is the whole point of our training the soldier for the specialized job. In war, it is only the untrained, inexperienced man who is killed or gets captured. It is the trained, skilled man who survives. There is no glory in dying for your country, but there is high honor in surviving and doing the best job you know how while you are surviving. It's all a matter of training a fighting machine. That machine is no stronger than its weakest human cog, or its loosest tank tread.

Fort Knox is the only Army post which houses the headquarters of an Arm, replacement center, a division, a research board, and a school all at one place. Lt.-Gen. Jacob L. Devers, commanding general of the Armored Force, is the only chief of an Arm whose headquarters is afield. With Gen. Devers, all at the same military installation, are the training center, or "grammar school," the Armored Force School, where a man gets his "high school" military education, and an armored division, which is his "college." The Armored Force Board conducts our ex-

One of the 500 buildings of the Armored Force School. This houses the reproduction department, which produces manuals and instruction material



periments with possible new weapons and vehicles. Furthermore, we have now a medical research laboratory where we can manufacture our own desert heat or our arctic cold.

It is possible by means of this apparatus to test a man under conditions of 140 deg heat, or 70-below-zero cold. Thus we are learning how the human machine reacts to thermal changes before the man actually fights in North Africa or Iceland or the jungles of the South Pacific. This scientific approach to a study of combat conditions should refute any civilian belief that the Army merely throws together a mob of men and then throws them blindly, without study or consideration, against its enemies.

The Armored Force School was activated in the summer of 1940. We had to go over our tables of organization and decide just how many tank mechanics, how many automotive mechanics and how many motorcycle mechanics the school would train. There were tedious weeks and months of day-and-night work fitting the parts together for the beginnings of the school. On Nov. 4, two years ago last fall, we were ready for the first students. They sat down in the corner of a mess hall; it was a classroom too, but that didn't last long. At that time we began training 217 officers and 1700 enlisted men.

Later, as the Armored Force assumed snowball-like growth, it became necessary to train three men where previously we had been schooling one. Of course we could have expanded the plant, but our teaching equipment was limited then. Eventually, still working with very few guns and very few tanks, we evolved a plan whereby it would not be necessary to add many more buildings. The automotive industry is noted for its mass-production methods. Why not borrow the methods we have learned in civilian mass-production? Why not go on a multiple-shift basis? We did. We have now had more than 18 months of successful multiple-shift operation. At first the Armored Force School student went to school at six in the morning and would be through for the day at noon. The next shift went to class from one to seven - a six-hour day, which gave us a 36-hour week. Meanwhile, in order to



keep these officers and men abreast of their practical military training, we worked them outdoors for two hours a day four days a week. As a consequence, they were learning all the time all the things they needed to know to live and do business successfully in battle.

When we started a double shift, we soon found that that was not enough. We had multiplied our human output only 200% and we needed a 300% increase. What would we think of the automobile manufacturer who waited until he had finished making one car before he started another? Based upon an analysis of what we were trying to teach our men, we established a "phase" system. If we are going to train a tank mechanic, we put one simple part in one building, another simple part in another building and a third and fourth in a third and fourth building. That is the secret of the automobile manufacturer, who breaks each operation down into simple steps.

UPPER RIGHT: A captain (center) explains the functions of parts of a tank engine



RIGHT: A sergeant explains the working of a truck engine to a class in what is said to be the largest technical school in the world

Operating that way we physically demonstrate to the man the skill that he is going to exercise in each particular building. We teach him in the shop with the tools that he is going to use in the field. Then he goes out on the job and practices that operation, and finally we give him an examination which actually demonstrates what he has learned.

Suppose Private Smith goes to the hospital with appendicitis, or has to go home because his mother is critically ill. That takes him off the human assembly line. However, when he returns, he never is further than four days from the particular phase he left. So he gets back on the "conveyor belt" with a minimum loss of time. It may be that when Johnny looks at the electrical fixtures in a tank for the first time it is his first experience with ohms, amps, and volts. For this reason, basic electricity may be hard for him. If it is, we may put that man through one phase twice, until he is ready to go on.

In training instructors, the phase system also plays its part. We take the specially selected officer or enlisted man and put him several times through the phase he is to teach. If he gets stale, we put him in another phase. In about a year and one-half he is qualified to teach any of several steps in training a tank mechanic or an automotive mechanic.

Later we needed to increase our output again. We lengthened our instructional day. The morning-class students would come in at six o'clock, as they had been doing, and would finish at one p. m. The second shift would come in behind them and attend class until eight p. m. This makes a 42-hour week in the school: we gained a day each week by adding one hour to each day.

About two years ago we assumed that it took nine months to make the well-trained soldier into a tank mechanic. Now we do it in nine weeks. I have been with tanks for more than 20 years and I feel that the instruction has not suffered appreciably by this schedule tightening.

How does this mass-production training work out in dealing with human beings? How are they grouped? What is the system?

We first give our students aptitude and achievement tests, in addition to the ones they have had before they come to the Armored Force School. We study their background and interests.

We train our students in nine departments - tank, communication, wheeled vehicle, motorcycle, gunnery, tactics, clerical, teacher training and officer candidate school. The courses vary in length from four weeks to three months. Clerks who run the vast paperwork needed to keep an armored division on its feet receive their training in the clerical department in four weeks. All must be able to type at least 30 words a minute before they are enrolled.

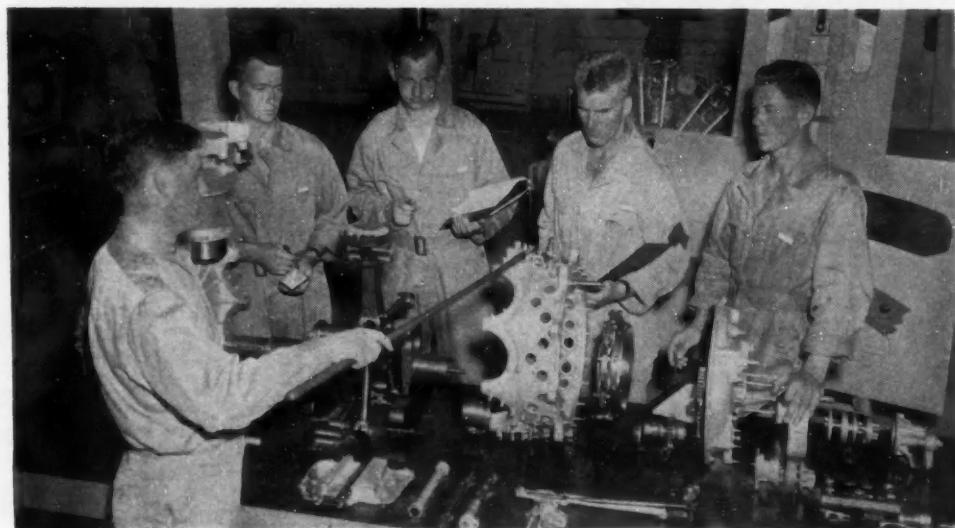
In the tank and wheeled vehicle departments repairmen and tank maintenance officers are trained in just under nine weeks. Radio operators and cryptographers are trained by the communication department in 14 weeks, radio electricians in 10, communication officers in three months. It takes us eight weeks to school a motorcycle repairman, while only four weeks are required to train a gunnery instructor, officer or enlisted man.

Our officer candidate school is operated by the Armored Force School and makes a second lieutenant out of an enlisted man in three months. First, a man must have had his three months' basic training. Our candidates are selected carefully, yet dozens fall by the wayside on their way up the grueling O.C.S. ladder. Officer candidate school men receive specialized training covering all the other departments of the school so that they are skilled with all the vehicles and weapons of the Armored Force as well as in the essentials of leading men.

It is typical of our Democracy that every man in the Army, everything else being equal, has an opportunity through O.C.S. channels to become an officer. With the rapid expansion of our fast-growing Army, thousands of efficient young officers are going to be needed.

In training the soldier technician an important element is creating interest in his work. If he is not interested, he will not derive the greatest benefit from his training. He is going to become a precision worker. When this war is over, he is going to have a trade to sell. He may have been a farmer, a miner or a common laborer, but now we will make him into a welder, a radio operator, or an airplane engine mechanic.

If a soldier technician is interested in his work, he must be interested in how his work fits into the international pattern. So we talk with the soldier technician about who is winning the war and why. Often we find he is not informed.



During the 11 weeks in the tank department student soldiers must learn to disassemble light and medium tanks. This group is studying parts of a radial engine.

"Did you read the morning paper?" we may ask.

"Yes," he says.

"What did you read?"

"I read the comics."

"Did you read anything else besides the 'funnies'?"

"Yes," he replies, "read the sports page."

"Did you read the first page?"

"No, didn't get to the first page this morning."

Probably he didn't read the first page yesterday morning or any mornings - so he didn't know who Rommel was, or where Buna was.

"Do you listen to the radio?"

"Yes, got three of them in the barracks."

"Do you hear the commentators direct from Europe, Africa and Australia?"

"No, when they come on we turn to Charlie McCarthy."

If our soldier student doesn't read the front page or listen to radio newscasts, how does he keep up on the news? We give the Armored Force School student 15 minutes of news orientation twice a week. We want him to know all the time who is winning this war and why.

Among Armored Force School departments the newest is teacher training. Since the school's courses are so brief and the requirements so exacting, we are focusing instruction into the latest approved teaching practices. Dr. Verne C. Fryklund, associate professor of industrial education, University of Minnesota, is serving that need. He gathered six outstanding civilian leaders in the industrial education field. All are expert tradesmen and all have had wide experience in both the industrial and educational field.

Combat repair, of course, must be accomplished under extremely difficult conditions. Accuracy, speed and confidence, quite naturally, are requisite. Expert teaching, it follows, is highly essential, and there is where the Teacher

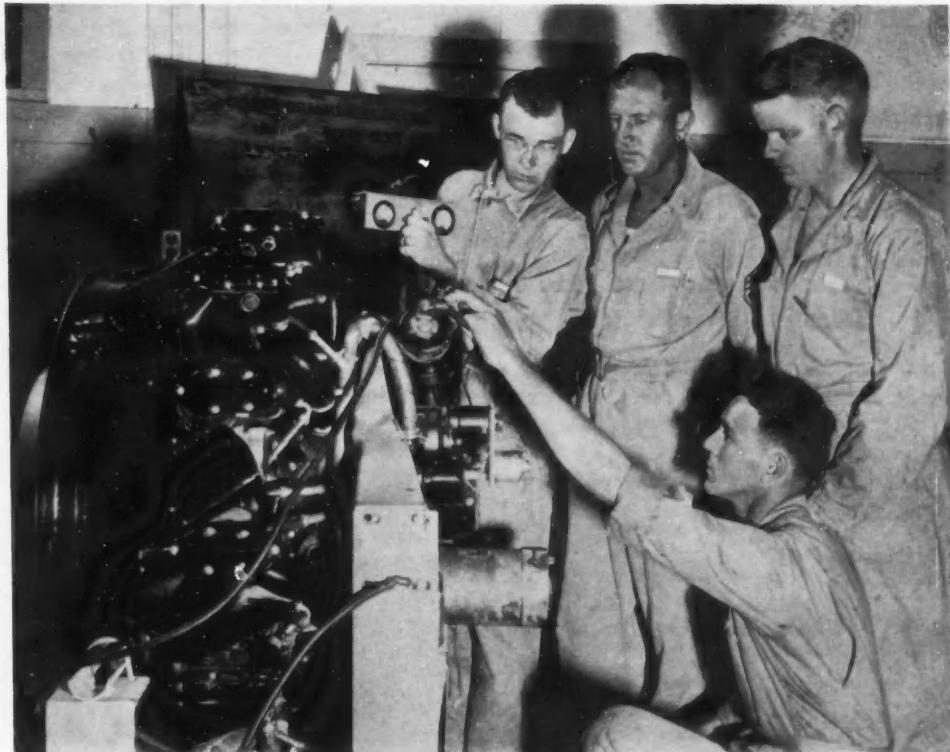
Training Department comes in. All our instructors must hold teacher training certificates before they are allowed to continue instructing in the school.

We have in addition to the school's technical departments the training group and the demonstration regiment. The latter is a miniature armored division and stages tactical demonstrations for other departments, and the training group acts as a "housekeeping" unit and is responsible for the feeding, paying, administration and basic military instruction of students in the Armored Force School.

Our reproduction department is our printing plant and our training film department is just what the name implies. The Armored Force School uses every visual aid possible in teaching a man how to do something. When the soldier sees on a large chart just how a machine gun is put together, it's much more effective than waving parts in front of his face, or sketching them on a blackboard.

Probably our most dramatic instructional aid is an ingenious tank identification table. A whimsical saying of the last war used to go, "We put three tanks out of action today - one of them was the enemy's." At the Armored Force School we are taking no chances that tankers won't know what both friendly and enemy tanks look like when they get into combat.

I had a sergeant from Pittsburgh who had done professional model making before he came into the Army. A Carnegie Tech graduate, he once had constructed a "land-slide" which won a big law-suit for a railroad company. Utilizing his wealth of civilian experience, we turned him loose with a carefully picked crew of model makers down in our tactics department. At once the group built tiny replicas of American, British, German and Japanese tanks. On a 10 x 10 ft table, this sergeant and his assistants constructed a life-like rural landscape. A realistic farmhouse



Another group studying a tank engine. These men are given hard military training while becoming proficient mechanics and combat vehicle repair men

went up, a barn with a real "haymow," plowed fields and pastures.

When completed we had a slice of "farmland" made to scale with a circular groove for rolling the tiny tank models across the landscape under different conditions of lighting. Thus it was possible for an officer or enlisted man sitting 30 ft away to see a friendly or enemy tank as it would appear at 300 yd on similar terrain. By using field glasses, students could stand still further back and identify the tank models at a distance too far for the naked eye even to detect the weapons of the model.

The Haskard map is an unusual training aid, built in England and shipped to Fort Knox in two pieces. It is so large that we had to build a special structure to display it. The map lies flat in an area occupying an entire large room and parts of two stories in depth. It covers a mammoth canvas upon which are painted the terrain features of a section of Salisbury, Wiltshire. The rolling English hills rise in the proper places under the stimulus of inclined sticks placed upright against guy wires underneath. Knobs of plumbing fixtures in others were slung so as to pull down the surface and represent lower ground.

With some 125 officers in advanced tactics classes sitting on a balcony above, a crew of five men standing under the map on the first floor manipulates small magnets which move tiny tank models on the top surface as the problem reader recites the situation. He may say, "our tanks are reaching hill 764 when they are stopped by artillery fire from the woods at our immediate front." A burst of fire is then simulated by a puff of cigarette smoke from a small syringe held under the canvas by one of the crew.

The Haskard surface already has been proved realistic before those who should know best. A group of British officers, standing over it recently, sighed, "it surely does look like home."

Being a center for training armored warriors, the Armored Force School is a constant clearing house for the latest advances in mechanized warfare. Military observers and attachés from the various continents repeatedly have lectured in the Armored Force School and now our officers and men are benefiting by the latest intelligence brought back personally from our newest fighting fronts. The school has been attended by officers and men of various other of the United Nations as well as by Americans. Numerous Britishers have taken special courses and we have a continually changing contingent of some 75 Canadians enrolled. Just now we have with us one young Chinese officer and an Australian. Last winter three Brazilian and four Argentinian officers were graduated.

There never has been anything easy about the Armored Force School. We make the courses just as tough as we know how. This is not because we want to be harsh, but because Hitler and Hirohito will not wait and we must keep our human assembly line rolling at top wartime speed.

Many specialized technicians make up those fighting teams, each taking his place in our mighty Armored Force. For example, we won't all be firing a tommy gun or driving a tank. Just as important is the man who operates a radio inside a tank with a sending key strapped onto his leg, teaches gunnery, or pounds a typewriter to keep an armored division's paperwork in double time. Our concern in the Armored Force School is training all these technical specialists for the objective we are all driving toward - winning this war.

## Revised Drafting Practice Manual

REVISED edition of the "SAE Manual of Aircraft Engine Drafting Room Practice" has been completed by SAE Committee E-8, Aircraft Engine Subdivision.

Changes affect Section B, which now presents a standard table showing the conversion of fractions to decimals in accordance with the decimal dimensioning system; Section D, with four pages showing data, standard notes and method of dimensioning recommended for preparing the production drawings of gears; Section E, dealing with the use of standard aeronautical threads and the application specifications thereof, showing the recommended form of notes to be used on drawings, and presenting four pages on straight screw thread specifications and two pages on taper pipe thread specifications.

Other changes affect Section G, which now has a revised page on abbreviations and symbols with appropriate additions, a new page on twist drill sizes showing the decimal equivalents of letter, number, and fractional size drills and preferred drill sizes recommended by SAE, and a completely revised page on drilled hole tolerances showing the recommended tolerance for the range of drill sizes and the standard form of notes to be used.

Minor revisions, corrections, and additions have been made throughout, and a new index, cross-referenced to facilitate locating various subjects, added to the table of contents.

Drawing sizes are standardized, these standards having been incorporated in the appropriate Army-Navy Aeronautical specifications and will be used hereafter by Government services. They are:

A, 8.5x11; B, 11x17; C, 17x22; D, 22x34; and R, all larger drawings to the maximum 42x62 in.

The "Manual" was prepared in an effort to standardize drafting room procedure, so that all drawings would be complete as to detail and commonly read and understood in the expanding aircraft engine industry, which uses mechanical drawings for communication between engineering, manufacturing, and inspection branches, and subcontractors.

A number of aircraft engine manufacturers already have adopted the "Manual," either using it in its entirety as the approved standard for their drafting rooms or making it the basis of their own manuals. Others are using the "Manual" for reference purposes, or are adapting it to their own uses by inserting pages of instructions and data peculiar to their plants.

More than 1800 copies of the "Manual" already have gone into use. Some manufacturers have purchased more than 150 copies, finding the "Manual" of value not only as the drafting-room "Bible," but also as a text book for training new employees.

The revised edition is loose-leaf, punched, and ready for insertion in standard three-ring binders. Revisions have been so extensive that it was found impossible to prepare sheets which could be inserted in the old "Manual." It is expected that in future additions or revisions, however, this will be possible.

Copies of the revised edition are available at \$1.50 each from the Society of Automotive Engineers, 29 West 39th St., New York.



## MILITARY MOTOR VEHICLES UNDERGO SAE TESTS IN NATURE'S COLD ROOM

SALENT of the SAE war engineering front has been thrust northward towards the Arctic.

There, where continuous subzero temperatures create an outsize natural cold room accommodating whole fleets of trucks, a group of American automotive engineers sponsored by the SAE War Engineering Board has been working with U. S. Army officers on the most thorough and extensive field tests of motorized military equipment ever undertaken.

Objective is development for the Army of tanks, trucks, jeeps, and other vehicles which will perform more satisfactorily and serve more efficiently than the winter equipment of any other armed force on earth.

Location of the Army camp at which Army personnel is putting Army motorized equipment through field maneuvers for observation by the engineers and Army proof officers necessarily is a matter of military secrecy. However, it can be revealed that the location is sufficiently polar to provide arctic conditions, such as temperatures to 50 F below zero.

The operation has developed from a series of cold room tests designed to aid in solving cold-starting problems which automotive engineers have been conducting for the Army since early in 1942. Arctic weather is particularly tough on automotive equipment. Ordinary lubricants become so stiff that wheels will not turn, or steering gears function. Gasoline lines and vent holes become blocked. Coatings of ice form on heater stacks. Batteries refuse to charge or discharge. Tarpaulins substituting for garages keep out wind, but not cold; catch fire from heaters which flare in whimsical breezes.

Vehicle operators garbed in thickly-lined parkas, snow boots, heavy woolen underwear and clothing, helmets, goggles, and mittens have to handle controls too small to grasp and too frozen to function. Repairs and adjustments must be made, and the choice is one between risking frostbitten fingers and fumbling with clumsy mittens in spaces scarcely large enough for a bare hand. The vehicles, parked outdoors, must be started and operated on whatever fuels are available. Sometimes, to stop is to remain stopped. The only alternative for man or vehicle is to keep going.

The engineering job of adapting automotive equipment to these conditions has been neither simple nor easy. Starting mechanisms in some cases function erratically, throttle and choke linkages jam, storage batteries deliver insufficient power despite insulation and heat. Fuel pumps freeze fast, ordinary crankcase oils jell, and customary chassis lubricants assume the characteristics of paving materials. Application of heat to overcome these difficulties creates a whole new set of problems.

The field test program calls for complete study of the effect of extreme winter conditions upon every part of a motor vehicle in actual operation, whether combat or transport work. Under observation have been such factors as the break-away flexibility of transfer cases and axles, ease of gear shifting, action of steering gears, functioning of brakes, condition of universal joints, operation of controls and control links, and effect of cold, wind, snow, and ice upon speedometers, batteries, ammeters, oil indicators, windshield wipers, fan belts, wiring, tires, tracks, brake linings, rubber parts, radiators, and antifreeze solutions.

The field tests have called also for measuring frost accumulations in engine compartments after heaters have operated for various periods; evaluating the efficiency of heaters both in cold-starting and in making tanks more comfortable; finding out what happens to radiator hoses, hydraulic lines, axle bumpers, engine mounts in continuously cold weather. Lubricants have been subjected to close study as have the effects of diluting crankcase oils and transmission and chassis lubricants, leakage past oil seals, and wear caused by channeling. Lamp bulbs have been checked for the effect of cold upon burnout and filament breakage. General tightening effect of low temperatures on all close fits has been studied.

The program of field tests has been developed on a weather-to-weather basis. Calling

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for everything in the book, sequel to cold-room tests, from starting frost-bound engines to observing the effect of snow in exhaust pipes, it includes tough service tests of the winterizing kits developed by the Army with SAE cooperation, of provisions for driver comfort, and of the effects of polar weather upon all the materials and all the items of equipment entering into the make-up and use of vehicles.

So far as the observers are concerned, the vehicles, as Army property, are mechanical guinea pigs identified by numbers instead of manufacturers' name-plates. Specialists on electrical equipment, carburetion, lubrication, fuels, tires, engines, brakes, power trains, transmissions, heaters, batteries and the rest have been working on all vehicles regardless of make in a cooperative effort at solving engineering problems created by natural cold. Some of the operations have involved controlled tests with instrumentation, but the effort largely has been concerned with field-testing equipment under conditions closely approximating actual war use.

Reports of the tests will remain matters of military secrecy, although manufacturers of vehicles and equipment will be informed of developments so that improvements in design and construction promptly may be undertaken.

The field test program has grown in scope from an engineering attack on cold-starting problems inaugurated by the SAE War Engineering Board in the spring of 1942 at the direct request of U. S. Army Ordnance Department. Under direction of the Board's Cold-Starting Committee, extensive tests were conducted in available cold rooms.

Outcome was development of Army win-

terizing kits and techniques which could be applied to motorized military equipment under production, awaiting delivery, or in use. It was found that while arctic temperatures could be duplicated in cold rooms, other conditions could not be simulated. Operations under war conditions in arctic regions produce surprising, sometimes disastrous, effects not always apparent in the limited space of the laboratory.

Comparison between cold room and field tests strikingly has been indicated by one of the test engineers. "You can step outside a cold room and get warm," he explained. "Here it is like wrapping yourself in four horseblankets, putting on a pair of boxing gloves, and then getting on the job to see what you can do in the way of handling dainty controls and gadgets that refuse to pull!"

Need for conducting tests with fleets of Army vehicles engaged in cross-country runs in subzero temperatures and over terrain deep in snow and ice having been obvious from the first, the Army shifted the project from laboratory to field as soon as the northern camp became available. The SAE War Engineering Board sought from various manufacturers the services of engineers who had had experience in arctic regions, who had conducted cold room tests, and who were specialists on various items of automotive equipment.

The specialists were organized first into a committee of observers, then into a Camp Committee responsible for developing the field tests and even for functioning as a fire brigade. To spare the Army's stock, the engineers were equipped for winter with heavy underwear and socks, woolen helmets, winter boots, parkas, snow goggles, gloves, and mittens from civilian sources. The cold proving even more intense than expected, the Army contributed additional items of clothing.

The Army knows the little group of officers on the freezing line as the "Ordnance Proving Ground Winter Detachment," the engineers as civilians temporarily ranked as proof officers. To the SAE the engineers comprise the Committee of Technical Observers organized by the SAE War Engineering Board's Cold Operation Steering Committee, *néé* Cold Starting Committee. Actually the group is made up of engineering representatives of American manufacturers of virtually everything automotive.

## Describes Evolution of Airplane Engine

■ SAE Club of Colorado

Airplane engine development from the earliest to the latest designs was traced by George N. Gromer, Mountain States Telephone & Telegraph Co., in a paper presented before the SAE Club of Colorado on Jan. 20. His subject, "Engines of War," honored the late Charles M. Manly, SAE past-president, and builder of the first airplane gasoline engine. The engine was built for the Langley plane which failed to fly when tested by the inventor. Mr. Gromer related, but later was proved capable of flight when placed on pontoons for the take-off.

He illustrated his talk with pictures showing the progress of aviation engines from the original Manly engine of 1900 to the present war models of all nations.

## Thanks, Ladies!

Technicians attending the SAE War Engineering Meeting in Detroit kept their war engineering departments running full blast during the hours they were away. Book-Cadillac telephone records indicate.

The daily average of calls during the SAE conclave was 8957 compared to an ordinary 4000. Each switchboard operator had to double in brass as a switchboard secretary, handling calls of 100 War Engineering Meeting attendees in addition to those of about 80 other hotel guests.

## Conservation Sidetracks Alloys Extravagance

■ Canadian

"Most alloys used in steel must be considered of a strategic nature during wartime. Anything that we can do to save alloys is helping the war effort right at the foundation of our whole structure," emphasized H. B. Chambers, service metallurgist, Atlas Steels, Ltd., at the Jan. 20 meeting of the Canadian Section. This statement is a fact, he explained, because the use of alloy tool steels permeates all industry in the form of dies, gages, shock tools, cutting tools, and so forth, and the use of either alloy constructional steels or stainless steels is a well-known necessity in practically every type of ordnance or military equipment.

"In the first place, the steel should be properly selected to fulfill the physical re-

quirements of any given application," he explained. "Even now, after more than three years of war, alloy tool and constructional steels are often employed where a carbon steel would be satisfactory. Higher alloyed steels than actually required are also being used frequently." Mr. Chambers urged that available physical property data be studied in order to avoid a waste of alloy. He pointed out that, with the so-called constructional steels which are usually identified as aircraft, automotive, and ordnance steels, the data will show that high-alloy steels are often unnecessary in the smaller sizes.

"A passive attitude of letting the other fellow revise his specifications while we continue to use extravagant alloy steels under the protection of peacetime specifications or ideas, is to be criticized," he said, "especially under emergency conditions." However, he pointed out that the reverse is also true; we waste alloys when a steel is selected which is not good enough for the job.

"After selection of the proper steel for the application, it must be heat treated properly," he cautioned.

Once the steels have been properly selected and heat treated, the job of saving alloys is not finished, according to experience and latest innovations in this field, he reported. It has been found that for wearing surfaces of dies and gages, structural parts, and cutting tools, the finer the finish the better the performance. Further, it has been found that for many wearing parts and cutting tools, this fine finish can be substantially improved by chrome plating, or in some cases of hot work and cutting applications, by nitriding.

Mr. Chambers stressed the importance of keeping scrap separate in plants. If alloy scrap is mixed, it cannot be utilized to best advantage. Different grades of alloy scrap should be kept separate.

"One Thousand Days," a film depicting Canada's war effort to date, and news releases of the amphibious invasion of French Africa and of U. S. naval operations were shown.

## Discusses Army Ordnance And Procurement Program

■ Washington

DESCRIBING the organization of the Army Ordnance Department, Col. William A. Borden of the Office of Chief of Ordnance, U. S. Army, gave his audience up-to-the-minute highlights of motorized artillery, tanks, and ammunition at the regular meeting of the Washington Section on Jan. 18.

He described the functions of the Technical, Industrial, Training, and Field Service Divisions, the Tank-Automotive Center in Detroit, the work of the Ordnance district offices, and the decentralized offices and units located outside Washington.

Col. Borden explained the magnitude of the vast procurement program, which is complicated by the necessity for redesigning guns, tanks, and other equipment upon the basis of engineering and military information received from the battlefronts.

Samples of ordnance items and photographs of the larger items were shown.

"Arms and equipment provided American soldiers," he said, "are superior in quality, firepower, and number to those supplied by any other army in the world."



Raymond D. Kelly  
SAE National Membership Chairman

Raymond D. Kelly heads the SAE National Membership Committee. SAE membership activities continue to accelerate to new highs as Mr. Kelly carries on the successful program executed in 1941 and 1942 under Robert F. Steenck. (See p. 12)

## Section Changes

"Mid-Continent Section" is the new name of the Southwest Group. Section status was granted the Group at the Jan. 15 meeting of the SAE Council.

★

The Dayton Section has been changed to the "Southern Ohio Section." The Council approved this change in name at the same meeting.

## Visualizes Drawbacks Of 70-Ton Carrier Plane

■ **New England**

Proposed 70-ton carrier planes will labor under several handicaps, believes Col. L. H. Cooper, U. S. Army, retired. A former automobile race driver, and World War I veteran who has been flying and specializing with airplane motors for more than 30 years, Col. Cooper spoke before the Jan. 14 meeting of the New England Section.

As examples of these handicaps Col. Cooper said that this type of plane would have to carry so much fuel that it would lower the carrying capacity of merchandise; speed would not be much above 150 mph; such a slow plane would not be easy to maneuver; it would have to be protected by others; it would be an easy prey for a fast antagonist.

## Structural Strength Seen Limiting Plastics Use

■ **Northern California**

In the opinion of George J. Brother, plastics have been overemphasized by the press. Although great progress has been made in the production of plastics, he feels that these developments need no press agent other than being presented to the public as factual, complete data. Mr. Brother, who is with the Western Regional Research Laboratory, voiced this opinion in a talk at the Northern California Section Meeting of Jan. 12. "Performance Characteristics of the Future Car" were brought out by R. C. Martinelli, instructor of Mechanical Engineering, University of California, who presented the second paper that evening.

The public has been led to believe that complete structures such as automobiles or airplanes could be made out of plastic materials, declared Mr. Brother. Actually the use of plastics is limited to those parts which do not carry appreciable mechanical load, he added, since plastics do not have high structural strength. For this reason he predicts that plastics will be used for such parts as car doors or fenders, for example, with metal or wooden frames provided for ample structure rigidity. In the case of future plastic aircraft, this framework would probably be composed of plywood bonded with resin, he said.

Mr. Martinelli's paper dealt primarily with the possible mechanical changes which would produce more efficient automobiles. He pointed out that although maximum gasoline mileage is obtained in present-day cars at road speeds of 25 to 30 mph, the decrease in gasoline mileage at higher speeds

# National Aeronautic Meeting



Hotel New Yorker  
New York City

★ ★ ★ ★

April 8-9

*Flying Fortress Photo, Boeing Aircraft Co.*

## At This Keyed-to-War Meeting . . .

A SYMPOSIUM on Aircraft-Engine Installation Problems will concentrate attention upon the solution of essential wartime problems.

OTHER PAPERS will discuss currently significant engineering subjects, such as:

*Field Maintenance and Repair of Fighting Planes!  
Aircraft Built of Wood! Electronic Equipment for Endurance Testing!*

*Testing, Aluminum Piston Operating Temperatures and Stresses, Cylinder Cooling, Shaved Gears, Intake Manifolds, Windshields.*

DINNER SPEAKER will be that noted aircraft designer and engineer

**Igor I. Sikorsky**

is not due to lower engine efficiency, but to the great increase in wind resistance and rolling friction at higher road speeds. Possible methods of increasing engine efficiency

as outlined by Mr. Martinelli are: the use of a continuously variable speed transmis-

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# RICKENBACKER'S OWN STORY

Heroic exploit in Pacific as told to fellow SAE members at Special Meeting of the Detroit Section



Below: Capt. Rickenbacker being helped from an airplane soon after the news of his safety was flashed around the world. "Rick did it again," breathed his thousands of friends and millions of admirers who had been praying for his safety

**D**ETROIT Section's most successful meeting was the Special Meeting in honor of Capt. Edward Rickenbacker, a member of SAE for the past 15 years. Excerpts from his talk of Jan. 22 are printed on these pages.

by CAPT. EDWARD V. RICKENBACKER

**H**AVING completed a similar mission for Secretary of War Stimson throughout England, Iceland, Newfoundland and Labrador, I was ordered to the Pacific on Oct. 19, 1942, to make a survey and inspection tour of our Army Air Forces throughout the Pacific, Australia, New Guinea and Guadalcanal, and to discuss not only with the high commands, but with pilots, gunners, navigators, radio operators, as well as the mechanics, and the troops on the ground, the difficulties experienced with our equipment, and through their criticisms and recommendations, to evaluate the relative merits of our own equipment in competition with the enemy's in actual combat.

Leaving California on the Pan American Clipper, I arrived with my aide, Col. Hans Adamson, a friend of many years' standing, in Hawaii the following morning.

We surveyed the aerial defenses at Honolulu during the day and arranged to leave at 10:30 p.m. on Oct. 20 in a Flying Fortress for a small island in the South Pacific, some 1800 miles away.

Press Association, Inc.

Arriving at the airport, we started down the runway, when I noticed we were headed for the hangars at about 90 mph.

By clever manipulation of the throttles, the pilot was able to pull the big Fortress back on the runway, but was forced to make a violent ground loop as we arrived at the end to keep from going into the bay.

Upon returning to the hangar we found a hydraulic line to the right hand brake had broken. The mail, baggage, tools and equipment were transferred to another ship of the same type, and at 1:30 a.m. of Oct. 21 we again took off.

It was a beautiful night — high scattered clouds and a three-quarter moon. We climbed to approximately 10,000 ft, leveled off, and headed south for an island which was to be our first stop.

Col. Adamson and I retired to our sleeping bags in the tail of the Fortress.

American ingenuity pressed into service amphibian tractors which are used on Guadalcanal as a bridge foundation. Thus Capt. Rickenbacker made his inspections of our Pacific aerial outposts for Secretary of War Stimson





*Detroit News*

Toastmaster Charles F. Kettering, Capt. Edward V. Rickenbacker, Henry Ford, and Special Committee Chairman L. P. Fisher

## Committee

ARRANGEMENTS for the Rickenbacker Special Meeting and Dinner were made by a committee of 17 Detroit Section members, headed by L. P. Fisher, with the assistance of Detroit Section Chairman Edgerly W. Austin. Charles F. Kettering, former SAE president, was toastmaster.

Serving with Mr. Fisher on the committee, in addition to Mr. Austin, were: Don Berlin, Lawrence W. Fischer, Edsel B. Ford, K. T. Keller, Mr. Kettering, Alvan Macauley, Ferdinand W. Marschner, R. Hudson McCarroll, Edward F. Petsch, George W. Romney, William F. Sherman, Earl H. Smith, Charles E. Wilson, Fred M. Zeder and James C. Zeder.

*Press Association, Inc.*

One of the more luxurious hell-holes where American soldiers and Marines are fighting "to preserve your way of life. Seeing men bleed and die for their country in that hell-hole of Guadalcanal was an inspiration I shall never forget," Capt. Rickenbacker told the Detroit Section

*Press Association, Inc.*

Two of the three life rafts which saved Capt. Rickenbacker and his party



At 10:30 a.m. we were overdue approximately one hour, so I asked the pilot to get a cross-bearing from our destination and another island some thousand miles from it.

We were advised by the radio operator at our destination that the equipment for such a cross-bearing was not available. However, the operator on the second island gave us a compass course, which meant little or

nothing because we might be at either end of the Pacific, yet thousands of miles away from the island we were looking for.

We were asked to go to 5000 ft and circle for 30 min, hoping that some other station might help the second one.

This also failed. I asked the radio operator to request the boys on the island for which we were looking to fire their anti-

aircraft guns and set their time fuses to explode at 7000 ft, hoping we might be guided by the bursting shells.

At the same time, we asked them to send all available planes into the air at approximately the same altitude, which was above the cloud level. But both failed, because

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# WELCOME TO RICKENBACKER!

*Detroit Pays Homage to Nation's Ace of Aces Today*

Capt. Eddie R.  
Hotel Book-C.

Jan. 22, 1943.

22



## Text of Rickenbacker Address at SAE Dinner

Flier Reaffirms Faith  
in American Ideals

The full text of Capt. Eddie Rickenbacker's address

### Rickenbacker Makes Plea for Greater National War Effort

(See Text of Rickenbacker Address on Page 22. Also Picture Story of His Visit to Detroit on Page 17.)

Before one of the greatest assem-

blies and the Japanese and 2  
million men and women of our transport planes becoming  
larger and larger and ever-increas-  
ing numbers because of the demand  
for air transportation of artillery,  
automobiles, tractors, bulldozers —  
everything needed for our troops  
overseas — one thought should be  
always in the minds of designers:

Seniority for Service  
Congressional  
Commission  
Chairs and  
Forces  
Laws  
Senate

### Among the Highlights of Rickenbacker Talk

600 men and women of Detroit. If you could only understand what  
they are doing in those hell-holes throughout the Pacific and the  
Europe, you would never dream that such heroic work  
could be done.

NEWSPAPERS from coast to coast carried reports of Capt. Rickenbacker's memorable address to the Detroit Section. Those parts of his talk dealing with economic and labor problems were given particular attention — and his forthright utterances were widely acclaimed.

Highlights of Capt. Rickenbacker's comments on labor and the war included the following:

"If you could only understand what your boys and mine are doing in these hell-holes throughout the Pacific and the burning sands of Africa, you would not worry about:

"Eight hours a day, overtime, or double time for Saturdays and holidays, or

"Whether you were producing too much per man per day."

Discussing the release of soldiers and sailors after the war is over he said in part:

"It is now time Congress should provide legislation to insure that:

"1. Upon his release or discharge, he can be employed by any employer without having to join any organized labor union,

"2. When employed, he shall have equal voting rights with any other employee on any employee-management plan of the employer, and

"3. His seniority in relation to other employees of draft age should date from the day he enlisted or was inducted into his country's service.

"A little more effort — a few more hours, a little more sincerity in your endeavors — may add necessary supplies and weapons to save the lives of hundreds of thousands of our boys.

"A nation is like a man: He who applies himself intelligently and sincerely a few more hours a day or a week will automatically find himself on top."

### Greetings to Rickenbacker



SAE President Mac Short and Henry Ford join Detroit Section Chairman E. W. Austin in greeting Capt. Rickenbacker at the Special Meeting of the Detroit Section held in Rickenbacker's honor.

### Thought for Engineers

"WITH this war certain to last two years more or possibly longer, with our transport planes becoming larger and larger and being produced in ever-increasing numbers because of the demand for air transportation of artillery, automobiles, tractors, bulldozers — everything needed for our troops overseas — one thought should be always in the minds of designers:

"Make everything simple to disassemble and reassemble, so it may be transported by air.

"This is an absolute necessity."

—E. V. R.

# WPB's Component Scheduling Program is Temporary Expedient

FOR the first time in the present war production effort of the nation, except for aircraft, actual scheduling — as understood by industry — has been undertaken by the War Production Board to speed up the manufacture of end products.

Critical components have been holding up completion and shipping of weapons overseas.

A staff of industrial executives under Ralph J. Cordiner, former Schick president, is busy reallocating orders of such components as heavy diesel engine crankshafts, for example, to increase output of this item which is delaying engine production. He is WPB's new Director General for War Production Scheduling.

Roy Johnson, Mr. Cordiner's executive assistant, told a small group of SAE members and other automotive executives in Detroit that:

- The scheduling program will be a temporary and emergency expedient.
- Only such components as are extremely critical will be dealt with, although the tentative list, included in Charles E. Wilson's letter of Jan. 20, included a list of 34 items.
- It may conflict with the Controlled Materials Plan, but since the items are relatively few, and in view of the fact that their total dollar volume is almost microscopic, this conflict will not be serious.

Factory representatives at the informal session agreed that it was a reasonable expedient, and expressed their gratitude that Mr. Johnson and Barrow Lyons, WPB information division, had explained the reasons for the interim general scheduling M order, and the plan itself.



## Renegotiation Contract Review Program Settles Down to Huge Task With Industry Aid

RENEGOTIATION, which has suffered seriously at the hands of inept theorists, has begun to shape up into a large money-saving program with these important byproducts:

- Shifting of contracts to plants which will speed production,
- Ameliorating the tax burden to manufacturers,
- Using only the minimum number of dollars to win the war, hence helping to avoid disastrous inflation,
- Helping industry to avoid criticism from the public which would follow unreasonable and excess profits on war contracts.

Maurice Karker, chairman, War Department Price Adjustment Board, is chairman of the Jewell Tea Co. He reports to Under-Secretary of War Robert P. Patterson, and has serving with him business executives of prominence.

Basic policy of the board is to have industry to initiate renegotiation.

The Army to date has saved more than \$1 billion by this program.



## CAA Needs Engineers

Engineers with experience in aerodynamics, structures, engines, propellers, or equipment are needed by the Aircraft Engineering Division of the Civil Aeronautics Administration.

Well paying civil service positions on war work are available in:

- New York,
- Kansas City, Mo.,
- Santa Monica, Calif., and
- Washington, D. C.

If anyone interested is now engaged in essential war work, release from present employer will be necessary.

Address application directly to the Aircraft Engineering Division, (A 290) Civil Aeronautics Administration, Washington, D. C.



## WPB Conservation, Salvage Units Named

With the resignation (effective Feb. 1) of Lessing J. Rosenwald as director of WPB's Conservation Division, two new divisions were created by Donald M. Nelson to handle the conservation and salvage programs of the war effort. Both the Conservation and Salvage Divisions will report to Curtis E. Calder, utility and investment executive, now director general for operations, succeeding Ernest Kanzler, resigned.

Howard Coonley is the new director of the Conservation & Substitution Division, which has three technical branches, and Paul C. Cabot is director of the Salvage Division. Both were Mr. Rosenwald's deputy directors.

### Conservation Division

Conservation & Substitution Branch, Harvey A. Anderson, chief. A veteran of nearly

three years in war work in Washington, he is also Mr. Coonley's deputy director of the division.

Simplification Branch, headed by Robert A. Shepard, and with A. M. Houser as assistant.

Specifications Branch, under C. Laurence Warwick, erstwhile secretary of the American Society for Testing Materials. Blodgett Sage is his deputy.

The Conservation Division consists of more than 100 technically trained specialists who serve various industry divisions of WPB and other Government agencies. Mr. Coonley was chairman of the Walworth Co., is a past-president of the National Association of Manufacturers and the American Standards Association.

### Salvage Division

These branches, with their respective chiefs, serve under Mr. Cabot:

Scrap Processors' Branch, Merrill Stubbs, chief. The former auto graveyard program is a part of this branch.

Special Projects Branch, headed by Andrew Yinkley, Jr.

Industrial Salvage Branch, the chief of which is Hamilton W. Wright.

General Salvage Branch, with W. Richard Talbot its acting chief.



## N. A. T. S. Expanding

LITTLE publicized, the Naval Air Transport Service, established Dec. 12, 1941, is now operating nearly 100 multi-engined transports over 40,000 route miles, with plans under way for an extension to Africa.

The 40,000 miles include routes to Australia, Alaska, Aleutians, Newfoundland, Brazil, the Caribbean, and throughout the United States.

Both Pan American Airways and American Export Airlines are operating supplemental contract services for the N.A.T.S.

Com. C. H. Schildhauer, an SAE member and formerly with Pan American and Glenn L. Martin Co., is officer in charge.

# Coordination is Key of Navy's Huge Aircraft Design and Procurement Task



CHIEF, NAVY BUREAU  
OF AERONAUTICS

REAR-ADMIRAL  
JOHN S. McCAIN, USN

by LESLIE PEAT

**P**RIME function of the Bureau of Aeronautics, U. S. Navy, is to coordinate the air fighting arm of the service with its battleships, carriers and other sea-going fighters. Even the most enthusiastic aeronautical officers of the Navy realize that the expansion program must supplement the Navy's shipbuilding and land-base program, thus developing a well-rounded and coordinated fighting navy.

Rear-Admiral John S. McCain, chief of the Naval Bureau of Aeronautics, is the administrator of our gigantic expansion of aircraft and fighting personnel. A veteran battleship commander with a long record of administrative duties since his graduation from the U. S. Naval Academy at Annapolis in 1906, Admiral McCain took to flying in 1935, and graduated from the Naval Air Station, Pensacola, the next year as Naval Aviator. He was then assigned as commander, Fleet Air Base, Coco Solo, Canal Zone, commander of the U. S. S. Ranger, and became successively commanding officer, Naval Air Station, San Diego, and then commander, Aircraft Scouting Force.

With this background, he was sent to the South Pacific, and there won the coveted Distinguished Service Medal for his "exceptionally meritorious service . . . his tireless energy and extraordinary skill which contributed greatly to occupation of the Guadalcanal-Tulagi area."

He succeeded Admiral Towers as chief of the Bureau of Aeronautics last October.

Graduating from Annapolis the year before the United States declared war in 1917, Rear-Admiral Ralph E. Davison served on various vessels during the war, and took up flying at Pensacola in 1918, graduating as Naval Aviator.

In December, 1923, he was selected as the U. S. Navy representative to accompany the proposed Polar Flight of Capt. Roald Amundsen, of Norway. He went to Italy, where the ship was being built, and studied European aircraft development while there. He was one of the pilots on the 1926 flight of Naval planes from the West Coast to Hawaii. He later served in a number of executive capacities at Coco Solo, and aboard carriers until 1937 when he was appointed chief of the Administrative Division, Bureau of Aeronautics. He again went to sea as a staff officer of what is now the Aircraft Atlantic Fleet, and in 1941 became head of the Plans Division of the Bureau. He became assistant chief of the Bureau last May, and last October was advanced to the rank of rear-admiral.

## Organization

As Assistant Chief of the Bureau of Aeronautics, Admiral Davison is the principal adviser to the Chief of the Bureau, and is the Executive Officer of the Bureau. His office is divided into three branches:

- Administration Branch, which supervises the compilation of Bureau regulations, is in charge of inter-Bureau and Inter-Departmental administration, and prepares all the annual reports of the Bureau. The Branch administers civilian employees, is in charge of correspondence and filing, office supplies, and administers the funds for these supplies and services.

- Financial Branch, which has general supervision of the financial affairs of the Bureau.

- Progress Branch, in charge of over-all coordinating, progressing, and expediting the Bureau's procurement program for aircraft, equipment, and personnel. It keeps constant liaison with other Bureaus in progress matters; prepares studies for the Chief and Assistant Chief on special problems; prepares and maintains graphic flow charts of procurement for all materials and equipment required by the Naval aviation service. It also prepares reports on share facilities, and handles the Aeronautics Statistical Report.

## Divisions of BuAero

The Bureau of Aeronautics is divided into these seven main divisions:

- Planning,
- Maintenance,
- Materiel,
- Personnel,
- Training,
- Flight,
- Photographic.

## Materiel Division

Of greatest interest to SAE members is the **MATERIEL DIVISION**. This is the nerve center of the procurement, engineering, and production programs of the BuAero, and the one from which several thousand SAE members, working for the Navy as officers or civilians, prime contractors, subcontractors, and materials suppliers take orders directly or indirectly. The Materiel Division is divided into these three Branches:

**PROCUREMENT BRANCH:** This branch initiates all procurement of aircraft, aircraft engines, propellers, equipment, and accessories required by the expansion programs promulgated by the Chief of the Bureau through the Director of Planning. These functions involve:

- Invitations to participate in aircraft design competitions,
- Prepares requisitions for the purchase by the Navy Bureau of Supplies and Accounts, of which Rear-Admiral W. B. YOUNG (S.C.) is chief, for all Navy, Marine Corps, and Naval Reserve airplanes, engines, propellers, equipment, and accessories.
- Conducts negotiations with bidders, analyzes all bids for costs, and prepares recommendations for award of contracts.
- Maintains liaison with Army Air Corps on procurement problems.
- Insures that procurement methods conform to law and policy.
- Supervises execution of all contracts.

- Procures Government-furnished material required for airplanes, engines, and other aeronautical items.
- Conducts negotiations for settlement of disputes regarding contract provisions of prices.
- Prepares recommendations to the Bureau of Supplies and Accounts for all changes and amendments to the Bureau of Aeronautics contracts.
- Prepares all project orders and changes thereof.
- Prepares recommendations for issuing letters of intent.
- Prepares reports and recommendations on applications for tax amortization certificates.

**ENGINEERING BRANCH:** Heads up all the aeronautical engineering work of the Bureau of Aeronautics, including:

- Supervision of design of all aeronautical equipment.
- Criticizes designs of aeronautical accessories prepared by other Bureaus.
- Supervises all experimental aeronautical work in the preview of the Bureau.
- Initiates new designs for prototype airplanes and evaluates experimental designs submitted to the Bureau.
- Initiates research and development work on aircraft materiel and equipment.
- Initiates instruction for flight tests of airplanes, engines, and other aircraft equipment.
- Initiates mock-up boards for experimental airplanes, and draws up reports.
- Advises on patent problems.

**Assistant Chief  
BuAero**



**REAR-ADMIRAL  
RALPH E. DAVISON, USN**

- Maintains and supplies the Bureau with aeronautical technical information, and keeps suitable files and records of engineering design.

**PRODUCTION BRANCH:** This branch is in charge of all the production supervisory administration of the BuAero from coast to coast.

Its functions include:

- Maintaining schedules for all aircraft, engine, accessory, and parts production.
- Studies and adapts design and manufacturing features of aircraft to facilitate production. This function involves design features for interchangeability, and the BuAero's extensive subcontracting program.
- Handles all priority questions in which the Bureau is involved in connection with supplies of materials, tools for aircraft and accessories, and other aeronautical items.
- Administers all Naval aircraft inspection policies, the inspection offices, and personnel. There are many such inspection offices throughout the country. This branch maintains liaison with the inspection agencies of the Navy Bureau of Ships, Navy Bureau of Ordnance, and the Army Air Forces. The branch also determines policy and methods of plant production, and handles labor matters.
- Maintains liaison with the Army, War Production Board, Joint Army-Navy Aircraft Committee, Army and Navy Munitions Board, Scheduling Unit, Foreign Purchasing Commissions, etc., on production problems, and has representation on the Subcommittee for Allocation of Deliveries.

**A**LL correspondence is to be addressed to the Bureau of Aeronautics, Navy Department, Washington, D. C., and not to the individual divisions or sections thereof.

## Preventive Maintenance

### Army-Industry Program To Improve Vehicle Care

**S**TANDARD operating practices to help new Army mechanics to do maximum repair work with a minimum of skill will be developed by Army maintenance officers with the cooperation of the Automotive Council for War Production's military vehicles division.

Organization for the work:

- Policy board of motor-vehicle manufacturers, to be headed by an Ordnance Department officer, and three committees to coordinate emergency research of:
  - Service engineering,
  - Service education, and
  - Preventive maintenance. (See letter from Secretary of War Stimson p. 32).

Each of these three committees will coordinate the work of subcommittees to handle work on:

- Light vehicles,
- Medium vehicles, and
- Heavy vehicles.

Each of these subcommittees will meet with subcommittees representing the contractors for parts, the ACWP announced.

I. B. Babcock, chairman of ACWP's mili-

tary vehicles division governing board, and Col. T. L. Preble, chief, preventive maintenance section, Field Service Division, Ordnance Department, both stressed the need for eliminating confusion caused by conflicting instructions issued by individual manufacturers in their respective manuals.

Manufacturers using identical parts publish different maintenance procedures because of lack of proper coordination, Mr. Babcock said.

The new Ordnance-industry groups will coordinate each of the 60 specified truck parts and components together, in the interest of speedier mechanic training and improved maintenance of Ordnance motor vehicles.



## Aero Production Hits New High

Aircraft production in the U. S. has topped the best year, in dollar volume, of the automobile industry with a total of \$5 billion worth of airplanes, engines, and propellers delivered in 1942.

The 1943 totals look like \$12 billion, according to the Aeronautical Chamber of Commerce.

Unfilled orders have reached \$22 billion. Other facts:

- Total employment of 630,000 is expected to reach 1,000,000;
- More than 175,000 women are employed;
- More than 73 million sq ft are used for aircraft production, and the eventual total may reach 100 million ft;

Forecast:

Bombers faster than today's fighters, and fighters capable of making 450 mph.



## Col. Johnson To Aid Small Manufacturers

Col. Robert W. Johnson, formerly chief of the New York Ordnance District, has resigned to become chairman of the Smaller War Plants Corp., established recently by act of Congress. He succeeds Lou Holland, who had the dual role of chairman of the corporation and director of the WPB Smaller War Plants Division, and resigned both.

As chief of the district, he became prominently identified with the effort to spread war contracts among smaller plants. In testimony before a Senate committee on Oct. 14, he said that 32% of the number of all outstanding Army Ordnance contracts in the district were with firms having 50 employees or less.

Col. Johnson succeeds Mr. Holland as WPB deputy director on Smaller War Plants.



## Ordnance Observations

BECAUSE the membership of the Society is participating to such a large extent in the design, production, and maintenance engineering of arms being built by the Army Ordnance Department, this space will be used each month for highlights of significant engineering developments.

As SAE members and other engineers - both in the Army and working for Army and Navy contractors - know, most of the developments on drawing boards and in production must remain censored.

But with the continued cooperation of the Army and Navy Public Relations of-

ficers, we will bring to our members significant trends of engineering, with emphasis upon the type of engineering thinking that is needed to win this war.

The following statement by Secretary of War Stimson indicates that maintenance engineering has full support of the top command. It is significant because such a statement would not have been expected a few months ago; the phrase "preventive maintenance" is relatively new in Army parlance; the call for a united campaign of preventive maintenance is engineering news:

### WAR DEPARTMENT

WASHINGTON

#### MEN AND WOMEN OF THE ARMY OF THE UNITED STATES:

Maintenance of trucks, tanks and all the vehicles of war at a high standard of performance is as important to the success of the Army as the physical fitness of its personnel.

The Army supervises programs to insure the continuing health of its men and women. Maintenance of the same degree of perfection in vehicles depends squarely upon their crews.

Whether you are in a training camp in the United States or in the forward line of a combat area, "readiness for battle" must be the standard by which you judge the condition of this equipment which has been entrusted to your care.

The whole long chain of production and supply--from assembly at the factory to delivery on a distant shore--is severed if a vehicle's high perfection is permitted to deteriorate through lack of responsible care.

I call on every man and woman serving with the Army of the United States to unite in a campaign of preventive maintenance designed to abolish the menace of mechanical failures and to get the most from the fine machines which industry has provided.

This is your responsibility. I depend upon you to see it through.

*Henry A. Stimson*

Secretary of War.

## SAE at Plastics Use Conference

SAE technical committee representatives participated Feb. 9 and 10 in a Philadelphia conference called by the Army-Navy Civil Committee on Aircraft Design Criteria to stimulate dissemination of information about physical properties of plastic materials.

Herman Klemin, Glenn L. Martin Co., represented the Aeronautics Division, SAE Standards Committee, to whom the A-NCC's original invitation had been extended, while R. A. Boyer, Ford Motor Co., attended as a representative of the SAE War Engineering Board.

Brought out clearly during the sessions, at which 175 representatives of the aircraft and plastics industries were registered, was the need of aircraft producers for more factual data about the physical properties of plastics - and the desire of plastics producers to obtain from aircraft men better information about aircraft requirements. The conference was instrumental, it is understood, in pointing the way to more effective achievement of both these objectives.

The A-NCC, under whose auspices the meetings were held, functions under the Army-Navy Aeronautical Board and is designed to act as a catalyst between Government and industry in establishment of design criteria.

Following a report on the conference by Mr. Boyer to the SAE War Engineering Board, the W.E.B. established a W.E.B. committee on plastics with W.E.B. Member R. H. McCarroll, Ford Motor Co., as sponsor.

## Aero Group

### Committee Named By President to Study International Policies

Under the chairmanship of Adolph A. Berle, Assistant Secretary of State, a committee of four interdepartmental officials has been formed to study international present and post-war policies. Members are:

- Robert A. Lovett, Assistant Secretary of War for air;
- Artemus Gates, Assistant Secretary of Navy for air;
- Wayne Chatfield Taylor, Under-Secretary of Commerce, and
- L. Welch Pogue, chairman, Civil Aeronautics Board.

Adviser is Wayne Coy, director, Office of Emergency Management and aide to the President.

## Tool Transfer

Transfers of idle machine tools financed by the Government will be made to plants urgently needing them, WPB announced in a directive signed by Donald M. Nelson, chairman of WPB, and Hans A. Klagsbrunn, vice-president, Defense Plant Corp. It was approved by James V. Forrestal, Under-Secretary of the Navy, and Robert P. Patterson, Under-Secretary of War.

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# About SAE Members

SAE Past-President **A. W. HERRINGTON**, recently elected a director of the Army Ordnance Association, was principal speaker at the annual alumni meeting of the Stevens Institute of Technology, held at New York City. Mr. Herrington, who is chairman of the Board of Directors of the Marmon-Herrington Co., chose as his subject "Our Part in Post-War Industry."

Announcement was recently made of the appointment of **B. C. HEACOCK** as Deputy Director General for Distribution of the War Production Board. Mr. Heacock, chairman of the executive committee of the Caterpillar Tractor Co., Peoria, Ill., joined WPB last December as Director of the Priorities Control Division.

**PETER ALTMAN**, 1942 SAE vice-president representing the Aircraft Activity, and director of the Manufacturing Research Department, Vultee Aircraft, Inc., is one of the pioneers in a new method for utilizing low-carbon-steel sheets for airplane fuselage panels, which consists in stretching open the slots in a sheet that has been slit in a regular pattern, then spot-welding this expanded sheet to a very thin straight-carbon-steel sheet. This combination, it is claimed, provides adequate strength and rigidity without adding weight.

**ABRAHAM H. WILSON**, formerly a student at the College of the City of New York, is junior mechanical engineer in the Signal Corps General Development Laboratories, Fort Monmouth, N. J.

Announcement was recently made by the Federal-Mogul Corp., Detroit, of the election of **EDWIN OLNEY JONES** as a vice-president. Mr. Jones, who continues as sales manager of the company's original equipment division, has been associated with this company since its organization in 1924, and

Mich. He had been assistant chief draftsman, Hudson Motor Car Co., Detroit.

Formerly assistant professor, Department of Aeronautical Engineering, University of Notre Dame, Indiana, **JAY A. BOLT** has joined the Stromberg Aircraft Carburetor Section, Bendix Products Division, South Bend, Ind., as project engineer.

**C. J. BLAKESLEE** has been promoted from superintendent to manager of priorities and purchasing, Automatic Transportation Co., Chicago.

**GEORGE F. KUTZELMAN** is an instructor at the Woodrow Wilson Vocational High School, Queens, L. I., N. Y. He formerly held a similar position with the Saunders Trade School of Yonkers, N. Y.

SAE Fuels and Lubricants Vice-President **WILLIAM M. HOLADAY** has left the Socony-Vacuum Oil Co., New York City,



William M. Holaday

and is in charge of the Aviation Section, Office of Petroleum Administration for War, U. S. Department of Interior, Washington.

**FRANK J. KUNNA**, formerly chief field service engineer, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J., is now service manager, Jack & Heintz, Inc., Bedford, Ohio.

**JOHN H. PIKUS**, who had been instructor in the U. S. Army Air Forces Institute, Air Forces Technical Schools, Scott Field, Ill., has been transferred to the position of automotive technician in the Maintenance Engineering Division, Holabird Ordnance Base, Baltimore, Md.

**EARL S. PATCH** has joined H. L. Crowley & Co., Inc., West Orange, N. J., as director of sales engineering, Dayton, Ohio. Mr. Patch, who is also technical consultant for the Office of Chief of Ordnance, War Department, Washington, had been sales manager of the Moraine Products Division, General Motors Corp., Dayton.

Formerly chief engineering aide, Machinery Allowance Section, Navy Department, **LEO M. EDWARDS** is now associate marine engineer, Navy Department, Brooklyn Navy Yard, New York.

SAE Past Vice-President **H. E. SIMI** has left the Twin Coach Co., and is now a member of the C. L. Gouger Machine Co., Kent, Ohio. His new work involves the



H. E. Simi

management of the latest plant of the company, formerly the Mason Tire & Rubber Co., and he is in charge of the engineering for the company.

**THOMAS A. BISSELL**, SAE staff engineer and technical editor of the *SAE Journal*, is the author of an article which appeared in the January issue of *Wings*, aeronautical publication sponsored by the Navy Bureau of Aeronautics and the Army Air Forces in the interest of increased aircraft production. The article covers Pratt & Whitney Aircraft's method of planning and scheduling for production of spare parts for aircraft engines.

**WILLIAM A. CRESSWELL, JR.** has accepted a position with Ranger Aircraft Engines, Division of Fairchild Airplane and Engine Corp., as analytical engineer. Formerly Mr. Cresswell was associate automotive engineer, U. S. Army Signal Corps, Radar Laboratory, Belmar, N. J.

**HAROLD F. BLANCHARD**, technical editor of *Motor*, has just announced the publication of "Motor's Truck Repair Manual." Designed to provide authoritative information on how to keep the country's trucks rolling, the manual covers the whole field of parts from air cleaners to windshield wipers, including manufacturers' specifications and recommendations. Large, clear illustrations, legible charts, and a concise presentation make the book easy to use, and therefore doubly valuable to every owner, operator, and mechanic interested in repair and preventive maintenance for trucks.

**H. FOLLETT HODGKINS** was elected a member of the board of directors of the First Trust & Deposit Co., Syracuse, N. Y. Mr. Hodgkins, president of Lipe Rollway Corp. and Rollway Bearing Co., Inc., is a member of the Army Ordnance Association.

**HARRY R. DESILVA**, formerly head of research, planning, and quotas, Automotive Rationing Section, Office of Price Administration, Washington, is now chief of the Distribution Section, Automotive Division, WPB.

**HAROLD CAMINEZ** is consulting engineer for the Aircraft Screw Products Co., Inc., Long Island City, N. Y.

**JOHN H. WALSH**, for over 20 years connected with the Middlesex & Boston street railway, has been named a vice-president of



Edwin Olney Jones

has been a director since 1929. Prior to that he was on the sales staff of the Federal Bearing & Bushing Co., one of the group which formed the corporation.

**ARTHUR C. BRAUER** is working as project engineer on machine guns at the U. S. Naval Ordnance Plant, Center Line,

the corporation. He will continue with his duties of superintendent of rolling stock.

Formerly a student at Iowa State College, **MERLE C. HUPPERT** is now in the Aircraft Engine Research Laboratory of the National Advisory Committee for Aeronautics, Cleveland, where he is junior mechanical engineer.

**GEORGE C. MEINSINGER**, who had been superintendent of transportation, Suburban Fuel Oil Service, Inc., Mt. Vernon, N. Y., is now with the Office of Defense Transportation, New York City.

**RAYMOND A. DARLING** has been transferred from the Grove City, Pa. plant of the Cooper-Bessemer Corp., to Mt. Vernon, Ohio, and has been promoted from engineering assistant to sales engineer of the Compressor Division.

**MAXWELL N. HALSEY** is no longer with the Bureau for Street Traffic Research, Yale University. He is now executive secretary of the Michigan State Safety Commission.

**NORMAN L. DEUBLE**, Copperweld Steel Co.'s manager of sales, is temporarily with the Steel Division of the War Production Board.

**JOHN M. PARKER**, University of California graduate, is a student engineer at Panama Canal, Balboa, Canal Zone.

**ROBERT E. GROSS**, president of Lockheed Aircraft Corp., has been elected president of the Aircraft War Production Council, Inc.

Elevation of **GEORGE H. ADAMS** to the position of executive vice-president is announced by the directors of The Bunting Brass & Bronze Co. of Toledo, Ohio. Mr. Adams' new responsibilities include supervision over all manufacturing, sales and research operations. Mr. Adams joined the company as sales director in 1928.



J. R. KESSLER, JR.

**J. R. KESSLER, JR.** has left his position of manager at the Oregon Parts Co., to join the Pratt & Whitney Aircraft Division of



Z. C. R. HANSEN

United Aircraft Corp. He has therefore resigned the chairmanship of the Oregon Section, and **Z. C. R. HANSEN**, former vice-chairman, is now chairman.

Heads Up  
New Stout  
Research  
Division  
of  
Consolidated



SAE Past-President **WILLIAM B. STOUT** has joined the research staff of the Consolidated Aircraft Corp., according to an announcement by T. M. Girdler, chairman of the Board of Directors. Although he will maintain headquarters in Dearborn, Mich., location of his laboratories — which will be

come the Stout Research Division of Consolidated — Mr. Stout is expected to spend considerable time in San Diego, working with Harry Woodhead, president of Consolidated, and **I. M. LADDON**, executive vice-president. The Stout Engineering Laboratories were founded in 1919.

**CHARLES P. SANDER**, aircraft engines vice-chairman of the Southern California Section, and formerly chief engineer of Kinner Motors, Inc., Glendale, Calif., has accepted a position in the Engineering Department of Ranger Aircraft Engine Division of Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y. **JACKSON G. KUHN**, who had been assistant chief engineer, succeeds Mr. Sander, and **GUNNAR EDENQUIST** has been elected vice-president and assistant general manager.

**RAY C. ROLPH**, Willard Storage Battery Co., has been transferred from the Toronto, Canada, office to Cleveland headquarters.

**LOWELL E. HAAS** has left his position of instructor at the University of Oklahoma, Norman, Okla., and is with the Climax Engineering Co., Clinton, Iowa.

**JOHN M. CAMPBELL** has been transferred from research engineer of General Motors' Research Division, Detroit, to the General Motors Proving Grounds, Milford, Mich.

**JOHN P. VIDICAN**, who had been contact engineer, Spalek Engine Co., Detroit, is now with Vultee Aircraft, Inc., Allentown, Pa., as project engineer.

On leave of absence from the California Institute of Technology, **ELDON C. BEAGLE** is serving in the Signal Corps of the U. S. Army.

SAE members figured prominently at the Honors Night Dinner which opened the sessions of the eleventh annual meeting of the Institute of Aeronautical Sciences, and at which honors were presented and awards made for achievements in aeronautics. **IGOR I. SIKORSKY**, Sikorsky Aircraft Division, United Aircraft Corp., received the Sylvanus Albert Reed Award "for the creation and reduction to successful practice of a helicopter of superior controllability." Certificates of Honorary Membership went to **WILLIAM A. M. BURDEN**, special aviation assistant to the Secretary of Commerce, and **T. P. WRIGHT**, Aircraft Production Board, WPA. **RUDOLPH F. GAGG**, assistant to general manager, Wright Aeronautical Corp.; **CLARENCE L. JOHNSON**, chief research engineer, Lockheed Aircraft Corp.; **JOHN G. LEE**, assistant director of research, United Aircraft Corp., and **WILLIAM T. SCHWENDLER**, vice-president and chief engineer, Grumman Aircraft Engineering Corp., were elected Fellows of the Institute. **T. P. WRIGHT** and **WILLIAM A. M. BURDEN** were among the guest speakers.

**EDWARD B. ABERCROMBIE** is an instructor of naval air cadets, U. S. Navy Air Corps, Naval Aviation Station, Livermore Field, Oakland, Calif. Previously Mr. Abercrombie had been an automotive mechanics teacher, San Francisco Public Schools.

**JOHN EGERTON BATCHELOR**, acting chief representative for Australia, Associated Ethyl Co., Ltd., Artillery House, London, S.W. 1, England, is also manager, Technical Service Division, Directorate of Armoured Fighting Vehicles Production, Ministry of Munitions, Australia.

**F. BRINT EDWARDS**, who had been general design engineer, has been made assistant project engineer, Vega Aircraft Corp., Lockheed Air Terminal, Burbank, Calif.

Formerly junior designer, Buda Co., Harvey, Ill., **R. BRUCE WISEMAN** is now an engineer with the Waukesha Motor Co., Waukesha, Wis.

## Thompson Advances Eight

Recent promotions in The Thompson Products organization include that of **PAUL P. JOHNSON** to manager of the newly-formed Aircraft Accessories Division of Thompson Products, Inc., which will have complete charge of the sale and production of all aircraft accessories. **DONALD E. BEATON** has been made general superintendent of the Division, and will have responsibility for production, manufacturing and assembly operations. **ED KRAUSE** has been named acting production manager, and **JOHN VAN EPPS**, factory engineer for this same Division. **MARION THORNE** has been transferred from the Pump Department of Thompson Products, Inc., to succeed Mr. Johnson as assistant to Vice-President **A. T. COLWELL**. **T. R. THOREN**, formerly air-



Paul P. Johnson



Donald E. Beaton



Marion Thorne

craft accessories engineer, is now chief development engineer; **H. E. JACOBUS**, who had been assistant aircraft accessories engi-

neer, is now aircraft accessories engineer, and **DONALD R. SPOTZ** has been made assistant aircraft accessories engineer.

**ROLAND W. ST. AUBIN**, who had been apprentice mechanic, American Airlines, Inc., La Guardia Field, N. Y., has been transferred to the Municipal Airport, Buffalo, N. Y., as airline maintenance mechanic.

**W. H. PEARSON** has joined the Kellett Autogiro Corp., Upper Darby, Pa., in the capacity of engineer. He had been assistant chief engineer with Szekely Co., Inc., Philadelphia.

**OSCAR WIEDERHOLD** has been detailed from the Automotive Section of the War Production Board to the Bureau of the Budget in the Executive Office of the President. He will act as technical adviser on automotive equipment problems of the non-military Government agencies. Before joining the War Production Board, he was automotive engineer with the U. S. Forest Service.

**JOSEPH C. THOMPSON** has left his position of plant engineer, Gaylord Container Corp., St. Louis, Mo., to join the Merz Engineering Co., Indianapolis, Ind.

Formerly body draftsman, Fisher Body Division, General Motors Corp., Detroit, **OSCAR MONROE VOILES** is now owner of the Voiles Engineering Works, Royal Oak, Mich.

**GEORGE H. KENDALL**, consulting mechanical engineer, has joined Sargent & Co., New Haven, Conn., as chief engineer. Mr. Kendall was formerly associated with the Norma-Hoffmann Bearings Corp., Stamford, Conn.

**C. H. DOLAN II** has left his position of general manager, Chicago Pneumatic Tool Co., Garfield Plant, Hydraulic Division, Garfield, N. J., to join Rearwin Aircraft & Engines, Inc., Fairfax Airport, Kansas City, Kans.

**ELLIOT DALAND** is with the P. V. Engineering Forum, Philadelphia, as chief engineer. He had formerly been designing engineer, Platt Le Page Aircraft Co., Eddystone, Pa.

Formerly industrial sales engineer, **WILLIAM HENRY WHITACRE** has been transferred to mechanical engineer in the Research Laboratory, Lubri-Zol Corp., Cleveland.

Directors of the Aircraft War Production Council, East Coast, Inc., recently elected **GLENN L. MARTIN**, president of Glenn L. Martin Co., Baltimore, president of the coun-

cil to succeed **GUY W. VAUGHAN**, head of the Curtiss-Wright Corp. The council, organized to pool ideas and knowledge, also established six committees. These groups include production, engineering and standards, materials, plant defense, industrial relations and public relations.

**DANIEL K. COYLE** is chief electrical and mechanical engineer, Joseph E. Bonadiman & Associates, consulting engineers of Los Angeles. He had been engineer of buildings and grounds, Vega Aircraft Corp., Burbank, Calif.

Several changes which recently took place at the Weatherhead Co., Cleveland, include **J. F. CONNELL**, who went from chief draftsman to development and liaison engineer; **W. R. WINNER**, from assistant chief draftsman to chief draftsman of product design; **J. POSAVAC**, from squad leader to assistant chief draftsman of product design.

**E. L. ALLEN**, formerly sales engineer,

Reid Products Division of The Standard Products Co., Cleveland, is now engineer at the Schonitzer Engineering Co. of the same city.

**BERNHARDT J. LITKE**, who had been project supervisor at the Ryan School of Aeronautics, San Diego, Calif., is now an instructor in flight engineering officer's training, Lockheed Aircraft Corp., Burbank, Calif.

**LEONARD TROY**, who had been engineer in charge of weights and structures, Aeronautics Division, Snead & Co., Orange, Va., is at present with the Strickland Aircraft Corp., Topeka, Kans., as vice-president in charge of engineering.

**ARTHUR J. BENT** has joined the Engineering Department of the Westinghouse Air Brake Co., Wilmerding, Pa. He was formerly manufacturer's sales representative, Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio.

## Obituaries

### Walter C. Keys

Walter C. Keys died suddenly on Jan. 25, just a few days following the close of the SAE War Engineering Production Meeting in Detroit, where he attended a number of sessions and talked with his many friends.

As mechanical product engineer with U. S. Rubber Co., Mr. Keys had been engaged in confidential research and experimental work on war projects for many months prior to his death, and had spent more than a few weeks on shipboard in submarine-infested waters. He first joined U. S. Rubber Co. in 1927, following a decade spent in executive engineering posts with the Standard Parts Co., the Eaton Axle Co., and the Gabriel Sales and Service Co.

Mr. Keys had his early automotive experience with Buick, the U. S. Motor Co., Cadillac, Chalmers, and the Church-Field Motor Co., after receiving his B.S.E.E. degree from the University of Michigan. In 1913, he rejoined Cadillac as assistant chassis engineer, and in 1917 went to Perfect Spring Co. as mechanical engineer.

A member of the SAE for 27 years, Mr. Keys was active in a wide range of technical and administrative committees, beginning during World War I and ending only with his death. Standards and research committees benefited tremendously from Mr.

Keys' contributions, his services having covered such diversified areas as springs, parts and fittings, and riding comfort. He was a member of the General Standards Committee in 1936, 1937, 1938, and 1939.

Mr. Keys was a member of the SAE Council in 1937 and 1938, having previously served in many important SAE administrative posts. He was active on the membership committee, of which he was chairman in 1935; on the Sections Committee; and in 1934 was chairman of the Life Membership Committee. For many years Mr. Keys contributed effective help to SAE meetings arrangements through his membership in the Passenger Car Activity Committee.

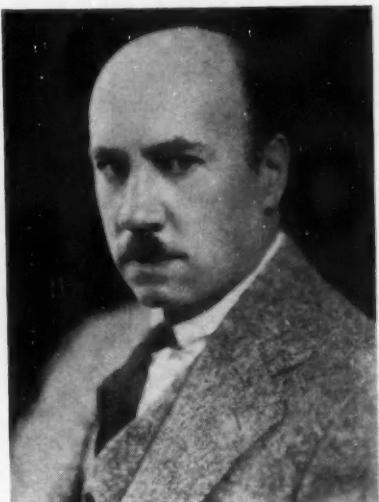
With Mr. Keys' death, the SAE has lost one of its most loyal and effective workers—and SAE members have lost a most valued and lovable friend.

### William H. Fenley

William H. Fenley, Western manager, Kerite Insulated Wire & Cable Co., Inc., Chicago, died recently at the age of 66. Mr. Fenley joined the Kerite company in 1915, having previously worked for Chicago Great Western Railway, Union Switch & Signal Co., and the Panama Railroad, where he specialized in electrical work.



Rex B. Beisel (above)



Igor I. Sikorsky (right)

United Aircraft Corp. announced recently the reconstitution of its two original airplane manufacturing divisions - Chance Vought Aircraft Division and Sikorsky Aircraft Division, which have been consolidated and operated as Vought-Sikorsky Aircraft since 1939. **IGOR I. SIKORSKY** will continue as engineering manager of the Sikorsky Air-

craft Division, and **REX B. BEISEL** has been named engineering manager of the Chance Vought Aircraft Division. The new arrangement has been made to permit the Chance Vought Division to concentrate on the development and production of combat types of aircraft, while the Sikorsky Aircraft Division carries on development of the helicopter for both military and commercial purposes.

**RICHARD H. DEPEW, JR.**, test pilot and aviation engineer who has been a licensed pilot since 1911, has become production coordinator of Fairchild Aircraft at Hagerstown, Md., it was recently announced. Mr. Depew formerly was general manager and executive vice-president of Taylorcraft Aviation Corp. He has been associated in some degree with Fairchild interests for 13 of his 20 years in the industry. He flew the first Fairchild-built airplane on its test flight in 1926.

**W. H. PAUL** has been made professor of automotive engineering, Oregon State College, Corvallis, Ore. He was formerly associate professor of mechanical engineering.

A new edition of the well-known text, "High-Speed Diesel Engines," has just been published by its author, **P. M. HELDT**, engineering editor, *Automotive and Aviation Industries*. Mr. Heldt's book covers the more important principles used in designing diesel engines and their equipment, and illustrates the application of these principles by brief descriptions of products incorporating them.

Since the basic principles remain the same, comparatively few revisions were needed in the portions of the book devoted to them. However, nearly all of the actual engines and equipment described in the previous edition have been superseded by later designs, so that descriptions of the newer models had to be substituted for the older ones. The new material covers particularly diesel fuels, injection pumps, governors, cooling of injection nozzles, and two-stroke engines. Mr. Heldt has also included two new chapters, one on Lubrication, another on Supercharging.

In its 430 pages, the new book includes about 60 new illustrations. Publisher is P. M. Heldt, Nyack, N. Y.

**M. M. DANA** has been promoted to commander from lieutenant commander, and is stationed at Pearl Harbor.

**W. C. LATROBE**, Bureau of Ships, U. S. Navy, has been promoted to commander, and is stationed in Washington.

**H. H. KELLY**, assistant director and chief of the Allocation Section, Division of Motor Transport, Office of Defense Transportation, has been appointed director of ODT's Division of Material & Equipment Requirements by Joseph B. Eastman. He succeeds Warren W. Kelly. **WILLIAM J. CUMMING**, chief of ODT's Vehicle Maintenance Section, will represent Mr. Kelly in respect to materials for vehicles. ODT is one of the 14 Claimant Agencies under the WPB Controlled Materials Plan.



**COM. JAMES D. MOONEY, USNR**, is now engaged in administrative work dealing with the transport, quartering, and supply of Navy personnel. Late in January he was transferred from the Navy Bureau of Aeronautics to the Bureau of Logistics.

Formerly automotive engineer, Socony-Vacuum Oil Co., Burlington, Vt., **LT. RAYMOND R. CUTLER** is in the U. S. Army, Ordnance Service Command Shop, Boston, Mass.

A leave of absence has been granted **JOHN W. SHEA** from the National Carbon Co., Inc., where he had been technical supervisor of the Eastern Division, covering anti-freeze and cooling system service problems, New York City. He is now a lieutenant in the Production Engineering Section, Eastern Procurement District, Army Air Forces Materiel Center, New York City.



Among SAE student members in service are **ENSIGN BENJAMIN J. LEHMAN**, USNR, formerly a College of the City of New York student, now stationed at the Brooklyn Navy Yard; **SALVIN S. MAHLAB**, formerly Columbia University student, now in the QM Training Regiment, Camp Lee, Va.; **DANTE J. ACCINNO**, Cooper Union School of Engineering graduate, now in the Ordnance Department, U. S. Army, Aberdeen Proving Ground, Md.; **2ND LT. WILLIAM F. PATTERSON**, University of Alabama graduate, now stationed at Camp Davis, N. C.

**FRANK N. SINGER**, on leave of absence as assistant manager, Division of Operations, American Trucking Associations, has been commissioned a first lieutenant in Army Ordnance, and is temporarily located at Chambersburg, Pa.

**LT.-COL. C. L. FIKE** has been assigned duty in the Engineering Section of the Bureau of Aeronautics, U. S. Navy, Washington. He was formerly executive officer, Marine Air Group 23, U. S. Marine Corps, Aviation Section, Unit 485, San Francisco.

Formerly a Massachusetts Institute of Technology student, **ALBERT E. MALL** is now in the 363rd Bomb Squadron, Langley Field, Va.

**LT. SHERWOOD H. EGBERT** is in the U. S. Marine Corps, and is stationed at Quantico, Va. In civilian life he was assistant to the superintendent, Boeing Aircraft Co., Seattle, Wash.

**LT. DOUGLAS J. KUHLMAN**, U. S. Army, has been transferred from Holabird Ordnance Base, Baltimore, and is now stationed at the Presidio in San Francisco, Calif.

**LT.-COL. W. S. JOHNSTON**, U. S. Army Air Forces, is resident representative at the Cardanic Corp., subsidiary of Carl L. Norden, Inc., where they will build the Norden High-Altitude Precision Bombsight for the Army Air Forces.

**HARRY MATHEWS** has been promoted from major to the rank of lieutenant colonel. He is stationed at the Tank-Automotive Center in Detroit.

**C. B. HOLST** is technical adviser, U. S. Army, Services of Supply, Requirements Division, Program Branch, Washington. He was transferred from the Ordnance Department.

**MAJOR AL BODIE** has been appointed chief of the Manufacturing Methods Branch, Western Procurement District, Materiel Command, Army Air Forces, Los Angeles. The Branch is composed of five major units: Production Methods Engineering, Production Control Methods, Production Analysis, Production Shop Practices, and Production Service. During the last World War, Major Bodie was in charge of Army aircraft-engine reconditioning and rebuilding shops in France, and was with General Motors Corp. when he rejoined the Army nearly two years ago.

**WILLIAM G. CHAMBERLIN** recently enlisted in the U. S. Army Air Forces, and is now stationed with the 752nd Basic Flying Training Squadron, Merced Army Flying Field, Merced, Calif.

## In Military Services

"Boy, how I would like to get on one of those ships and take a long trip!" he remarked, looking wistfully from a window in the Whitehall Building, down on New York's Battery Place. That was four years ago, when "Chris" was sales engineer for Tidewater Associated Oil Co.

Well, he got it.

**MAJOR C. LINCOLN CHRISTENSEN**, Ordnance Department, is in North Africa and is having the time of his life, he writes. For example:

"About a month ago I made a 1600-mile trip in a jeep across North Africa . . . I saw every type of humanity and of scenery to be found on the globe. . . ."

He is executive officer for the maintenance division of his outfit in North Africa, and has been busy setting up shops of the 4th Echelon for maintenance of all Ordnance Materiel.

Formerly technical editor of *Automobile Trade Journal*, he used to write about some of the world's finest automotive maintenance shops—in America. Finding shelters for his shops, amid tropical deluges and sand storms, is, he says, another problem. But, he adds, he's been successful.

**COL. GEORGE ALAN GREEN** is technical adviser for Lend-Lease, American Embassy, London, England. Formerly Col. Green was vice-president and director of the General Motors Truck & Coach Division, Pontiac, Mich.

Formerly in the U. S. Army's Motor Transport Division, 3rd Service Command, Fort George G. Meade, Md., **CAPT. ALLEN TAYLOR** is now shop officer, 1353rd Service Unit, Ordnance Service Command Shop, Richmond, Va.

**MAJOR J. D. TEBBEN**, U. S. Army Air Forces, has been transferred from industrial specialist, WPB, Washington, to Wright Field, Dayton, Ohio.

**CAPT. F. O. TERRILL**, who is on leave of absence from his position of chief of transportation and warehousing, Kroger Grocery & Baking Co., Cincinnati, is now with the Office of The Quartermaster General, War Department, Chicago.

Formerly a lieutenant and assistant air officer, U. S. Navy, U.S.S. Albemarle, C. D. CASE has been promoted to lieutenant commander, and is at the Naval Aircraft Factory in Philadelphia.

**CAPT. W. H. WARNEKE**, formerly garage superintendent of the United Dressed Beef Co., New York City, is now in the U. S. Army, Ordnance Department, Field Service Division, Maintenance Branch, Office of Chief of Ordnance, Washington.

**2ND LT. JOHN E. ISEMAN** is in the U. S. Army Air Forces, Air Service Command, Patterson Field, Ohio, as group supply officer. In civilian life he had been service district manager, Pontiac Motor Division, General Motors Corp., New York City.

**JOSEPH A. SCIRA** has been promoted from lieutenant to captain, and has been transferred from U. S. Army 422nd Engineer D. T. Co., Camp Claiborne, La., to 6th Headquarters and Headquarters Det. Sp. Tr., 2nd Army, Camp Pickett, Va.

**LT.-COL. A. C. RASMUSSEN**, U. S. Army, Ordnance Department, is chief of the Cincinnati District. He was appointed to Officers Reserve Corps in 1930, and ordered to active duty with the Cincinnati Ordnance District in 1940. Last year he was transferred to the Fifth Service Command.

Board, Washington, **COM. WILLIAM CHATTIN WETHERILL**, USNR, is assistant inspector of naval aircraft, Philadelphia.

**CAPT. HARRY PRICE** is no longer post Ordnance Officer, U. S. Army Air Forces, Advanced Flying School, Moody Field, Valdosta, Ga. He is now at the Command & Staff School, Warner Robins Depot, Macon, Ga.

**1ST LT. DONALD McALLISTER**, who had been design engineer, Worthington Pump & Machinery Corp., Holyoke, Mass., is in the U. S. Army, and is stationed at Fort Levett, Portland, Me.

**CLARENCE G. WOOD** has been promoted from captain to major. He was called into service early last year as a captain, after 22 years in the Reserve Corps. Major Wood had served 18 months in World War I. He is with the Cleveland Ordnance District, and recently was assigned to duty as officer-in-charge at Lima Locomotive Tank Arsenal, builders of Medium M4 Sherman tanks.

**GEORGE GUBAR**, who had been junior tool designer, Wright Aeronautical Corp., Paterson, N. J., is now with the 486th Bombardier Training Squadron, U. S. Army Air Forces Bombardier School, Midland, Tex.

Formerly manager of lubrication sales, Seaside Oil Co., Santa Barbara, Calif., **PAUL M. McCONIHE** has been commissioned a captain in the U. S. Marine Corps Reserve, and is stationed at the Quartermaster's Office, Depot of Supplies, San Francisco, Calif.

**LT.-COL. ARTHUR B. DOMONOSKE**, on leave of absence from Stanford University, is in the U. S. Army Ordnance Department, Tank-Automotive Center, Development Branch, Detroit.

**SAMUEL VANCE KRAUTHOFF**, U. S. Army, 58th Field Artillery Battalion, Fort Knox, Ky., has been promoted from major to lieutenant colonel.

**LT.-COL. W. M. CROFTON**, commanding, is in the Ordnance Department, U. S. Army, Headquarters First Battalion, 302nd Ordnance Regiment, Fort Ord, Calif. In civilian life he had been sales engineer, Induction Heating Corp., New York City.

**JAMES I. CLOWER** is now a captain in the Ordnance Department, U. S. Army, and is on duty in the Technical Division in Washington. He was formerly professor of machine design, Virginia Polytechnic Institute, Blacksburg, Va.

**LT.-COM. D. B. PEYTON**, USNR, formerly with the Standard Oil Co. of Indiana, has been detached from the Naval Aircraft Factory, Philadelphia, and is now stationed at the Naval Air Station, Pearl Harbor.

Transfer of **LT. JOHN I. CICALA** from the Maintenance Branch to the Development Branch of the Ordnance Department, recently took place. He is lubrication and fuel engineer in the Component Section, Fuels and Lubricant Unit, Detroit.

**E. F. GRIEP** was recently commissioned a lieutenant commander, USNR, and is now stationed at the Bureau of Ships, Navy Department, Washington.



Lt.-Col. A. C. Rasmussen

**ALLEN E. CLEVELAND**, formerly in the U. S. Army QM Corps, Motor Transport Division, Office of The Quartermaster General, Washington, has been promoted from lieutenant to captain, and is stationed in the Ordnance Department, Tank-Automotive Center, Detroit, where he is chief of the Truck Development Unit.

**MAJOR H. P. WHITCAMP**, formerly in the U. S. Army QM Corps, Headquarters 6th Corps Area, Chicago, is now on foreign



Major H. P. Whitcamp

duty, Headquarters European Theater of Operations, U. S. Army, Area Petroleum Office.

**GARLAND C. RICHARDSON** has resigned as chief of the Motor Vehicles Section, Automotive Division, War Production Board, to accept a commission as captain in the U. S. Army. He has been assigned to the Maintenance Engineering Branch of the Ordnance Department, Tank-Automotive Center, Detroit.

Formerly priority specialist, Shipbuilding Construction Section, War Production

# Rickenbacker's Own Story

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we were so many hundreds of miles beyond.

Then I asked the pilot to resort to the old method of boxing our position, with the hope of finding another island or a ship. But all of this was without avail. Time was passing rapidly. Our gasoline supply was being depleted.

We had all definitely concluded that a crash landing was inevitable, and approximately an hour before it took place everything loose in the ship was thrown overboard through the bottom hatch to the blue Pacific, 5000 ft below: half a dozen sacks of mail we thought important, tool kits, bed rolls, baggage, empty thermos bottles, and finally my own bag with many things I had learned to cherish. Then my brief case with important documentary letters, of which there were no duplicates in the world.

When life is in question, one suddenly realizes how little material things mean to us.

Rations and water were placed in the radio compartment with five of us preparing for the crash. The pilots and mechanic were in the cockpit.

We braced ourselves, and then I requested the radio operator to send the S.O.S. This he pounded out for practically an hour, until a fraction of a second before we hit.

We had already shut off both outboard engines to conserve gasoline, and we were cruising at a minimum speed—always hoping against hope that we would see an island or a ship.

## Fuel Exhausted

At about 2:30 p.m. of Oct. 21, after gradually descending to within 50 ft of the ocean surface, I kept listening for the first sputter of an engine to warn us all that the time had come.

In a few minutes it occurred, and a few seconds later there was a horrible crash. The upper hatch flew open and it seemed as though the whole Pacific was pouring in.

The window at my side was smashed. I was drenched with ocean water.

Almost instantly there was a second violent crash—part of our radio equipment had broken loose in the tail, and came hurtling madly through the radio compartment door into our midst.

The radio operator banged his nose against the dials, receiving a nasty gash. Col. Adamson was moaning that he had wrenched his back. The engineer had pulled the levers from the cockpit to spring the two main life rafts out of the front end of the plane, which inflated themselves automatically. These were held fast to the plane with a piece of twine approximately 50 ft long. The one on my side was badly tangled around the raft.

Again life was paramount. Rations and water were forgotten because the average period before the sinking of such a plane is 30 to 40 sec. We had only one thought in mind—getting everybody out and into the rafts, which we did.

The two-man raft had to be inflated and thrown overboard. It seemed hours, but within a few seconds we were all out and

scrambling madly to get away from the sinking Fortress. The waves were breaking over the rafts, and it was necessary to start bailing immediately.

Unfortunately, the little sergeant fell overboard while trying to get into the two-man raft with the navigator, and swallowed some salt water. Many of the boys were violently ill because of the roughness of the sea, but the little sergeant was most affected.

From then on it was a matter of organizing our efforts and conserving our strength—not knowing or having any idea how long the ordeal would last.

We did not know where we were. We knew that no one else knew where we were—a hell of a place to start from, and a hell of a place to be looked for.

I admonished everybody to refrain from drinking salt water or smoking. Both were dangerous because we had no fresh water or food.

## Oranges Doled

Having four small scrawny oranges, we decided to use one every other day. We carved them into eight equal parts, a small bite per man. With seven pairs of hungry eyes watching, your ability as a carver becomes perfect.

On the second day, we ran into a five-day calm with horrible heat. The surface of the ocean was like a mirror. And at night we would freeze by being splashed and soaked by the breakers or the sharks—which were with us from the time we took to the life rafts until we were picked up.

On the fourth and fifth days, I noticed Sgt. Alex growing steadily weaker. We had to cut down the periods between eating the bits of orange because of the horrible thirst that had developed—the last orange was rationed out on the sixth morning. With the realization that there were no more oranges came pangs of hunger in addition to the thirst.

I noticed our mechanic had a Government issue Bible in the early days, and we organized prayer meetings every morning and every evening, taking turn about in reading chapters, after uttering the Lord's Prayer.

On the afternoon of the eighth day, we pulled our little rafts together and prayed, humbly and frankly, for food and water, and for our deliverance. If I did not have seven witnesses to the fact, I would not dare tell this story: Within an hour, a sea gull came in from nowhere and landed on my head.

I raised my hand and grabbed him, feeling that I was shaking the whole Pacific Ocean from nervousness. I wrung his neck, feathered him, carved him into eight equal portions—saving the intestines to bait two small lines and hooks.

Capt. Cherry caught a small mackerel in a few minutes, about six to eight in. long, and a little later I caught a little speckled seabass about the same size, which helped to stifle the pangs of hunger and thirst. I carved up the first one in equal portions. Everything was eaten—head, bones and fins.

We saved the second one for the following day.

At about midnight a violent squall blew up and the two-man raft, which was tied to the rear of mine, broke away and we had to paddle madly to catch it.

Then, during our effort to catch a little rain water in our shirts, socks and handkerchiefs, Capt. Cherry's raft, which was tied in front of mine, was turned upside down causing a mad scramble. Only by superhuman effort was it righted, and only after we had lost 10 or 15 min of opportunity to catch valuable rain water.

However, we accumulated a quart and a half in each of the two large rafts by wringing our soaked shirts, socks and handkerchiefs into the bailing bucket. Then I mouthed it out of the bailing bucket and forced it into the Mae West lifesaving jacket. This we rationed out to each man, starting the following day at the rate of two sips per man per day—half a jigger.

Sgt. Alex was growing violently worse—in fact was in a state of coma most of the time. I had him switched to my raft so that I could cuddle him as a mother would a child to give him the warmth of my body. This I did for two nights.

On the night of the 12th day, he expressed a wish to get back into the little raft, and about 3:00 a.m. I heard his dying gasp.

However, having had no experience with burying men at sea, though I had taken them from burning racing cars and burning planes, I insisted that we wait until daybreak before examining him.

At 6:00 a.m. I called the other boys together, as I wished witnesses to my decision, as well as to have him examined by others. I pronounced him dead, which was verified by Capt. Cherry and Co-pilot Whittaker. Then came the hardest job of my life. I undressed him, gently lifted him out of the raft and into the blue Pacific. He died a soldier's death, without a complaint.

Never once did he whimper in those trying days in spite of the fact that I found out later he had only been released from the hospital in Hawaii about three weeks before, after a very bad case of yellow jaundice. He had also had an appendectomy a few months previously.

The days grew longer and the nights turned into eternity. Men moaned in their nightmares, and shrieked from fear. Confessions were offered by all for their sins of commission or omission since childhood. No man living knows the innermost secrets of these six men better than I, but these are locked up forever.

Sharks bumped the bottom of our rafts—splashing us day and night. Always we would wait and pray for daylight.

Then on the evening of the 18th day out, we heard and saw an airplane. We waved and yelled like maniacs, without avail—it was far away—pilot could not see us.

The following day we saw two more airplanes, but with no better results. It was heartbreaking beyond imagination.

Men were growing thinner, becoming skeletons of skin and bone. Little was said except when someone wished to give up. Then I used the only weapon I had, which was to brutally condemn and ridicule them until, as they confessed later in the hospital, they were all so mad they promised themselves to outlive me and have the privilege of dumping me into the Pacific.

On the 20th day we saw four airplanes—

again without results. That evening the boys decided to split up, and Capt. Cherry, after a violent argument for an hour with me, cut the rope and finally pushed off.

Then the co-pilot, navigator and radio operator decided to do the same thing. Again a violent argument. This left me alone with Col. Adamson and Sgt. Bartek, our engineer, both of whom were more dead than alive.

The following day the 21st out, was a repetition of torture until about 4:00 p.m., when we heard and saw two planes that passed us up. But they came back and spotted us.

One came down low enough to wave and I waved back frantically, to let them know that we were not three dead men on the raft. They both disappeared and within an hour came back again. But in the meantime a black squall blew up and they missed us. About 30 min later, they came through the black squall, spotted us and one stayed about 500 ft above, circling. The other disappeared.

The sun was going down and I wondered when he was going to land—but he kept circling and I kept waving my old hat. When darkness was about two-thirds on us, he fired a white flare and a minute later fired a red one. Over the horizon, we saw lights blinking in code—which meant a surface craft was on its way to us.

#### Unbelievable Landing

He then came down and landed on the surface of that rough ocean and in the darkness—an unbelievable feat. He taxied up within a few yards of us and I paddled madly over. It was a Navy plane, single engine, pontoon type.

With Herculean effort, the pilot and machinist's mate hoisted Col. Adamson into the cabin—eight or ten feet above—then Sgt. Bartek, and then me.

We were lifted to the side of the cockpit, seated on the wings with our feet over the leading edges—the most comfortable seat I ever had in my life!

The pilot said he would have to taxi 40 or 50 miles to his base, and after 30 min of taxiing a PT torpedo boat came up. It was agreed to take Sgt. Bartek and myself off the plane and aboard the speed boat.

We arrived at an outpost in the Pacific that was only a few weeks old. A small Navy medical unit had arrived a few days before, but there was a little hospital there with eight or ten cots, under the beautiful palms with the moonlight shining; it was truly a Shangri-la.

A few days later, all except the radio operator and the engineer were moved to a Navy base hospital many hundreds of miles south in PBY Navy Flying Boats.

Fortunately for me, with faith in the Almighty and a constitution given me by my parents, I bounced back rather quickly, and in two weeks continued my mission in a new plane that had been sent out from the United States with an expert crew by the Secretary of War.

Practically all of our flying over this vast ocean was done at night, and during the day I performed my duties, contacting the highest to the lowest.

I eventually arrived in New Guinea, via Australia, alone. I had to leave Col. Adamson at the hospital as he had developed a serious case of pneumonia, and again we almost lost him. I promised him I would be back in 10 days, and wanted him to be ready to accompany me home.

In New Guinea I found our Air Force boys accomplishing the impossible. They were always doing too much with too little. Under abnormal conditions, they were bringing down four and five enemy planes for every fighter we lost. The heavy bomber Flying Fortresses were bringing down eight to ten enemy planes for every one we lost.

The boys on the ground in Buna and Gona—hell-holes of the Pacific—were fighting in the jungle with its filth, vermin, and mud; to say nothing of the Japs, diarrhea and malaria.

Our Air Force boys were transporting reinforcements, supplies, ammunition, cannon, rations, and evacuating the wounded. It was the only form of transportation available.

Returning to Australia, and then through the Fijis to Guadalcanal, I arrived in this hell-hole as the rainy season was starting.

Henderson Field runway is a metal strip that has been bombed and shelled for months, and is also the airplane graveyard of the Pacific, not only for enemy planes, but our own as well.

Dugouts were filled with mud and water. Men were working in jumpers without shoes or socks. Marines and soldiers were in the fox-holes with billions of mosquitoes. Malaria was prevalent, as was diarrhea.

Seeing men bleed and die for their country in that hell-hole of Guadalcanal was an inspiration I shall never forget.

I finally arrived at the hospital in the Samoa Islands, hoping that my friends and comrades, Col. Adamson and Sgt. Reynolds could be taken home, as the other four had left for the United States when I left the hospital to complete my mission.

Unfortunately, the Colonel had developed serious lung trouble, necessitating an operation during my absence. However, I dared not leave him behind and alone, and after a few days' visit with him the doctors agreed that I might take the chance of bringing him home, provided we took a doctor and a nurse along.

They also decided that Sgt. Reynolds, who was still thin and gaunt and hardly able to walk, could go along.

This was probably the happiest moment of my life. We loaded Col. Adamson into our large plane on an adjustable hospital bed, placed a cot for Sgt. Reynolds alongside, and took off for another outpost at 10:30 p.m., Dec. 14, arriving some 1200 miles away at daybreak.

We refueled, had breakfast, and proceeded to Hawaii, another 1200 miles across the broad Pacific. I hospitalized them for a night in Hawaii to permit them a rest.

The following evening at 8:30, we took off for San Francisco, 2400 miles away. Again, on our arrival there, I hospitalized Col. Adamson for a night, and left Sgt. Reynolds in San Francisco with his parents—and at home.

The following day, we took off, stopping at Los Angeles for an hour where I met my little old mother in her 80th year—then carried on throughout the night for Washington, arriving at 9:15 a.m., Dec. 19.

I placed Col. Adamson in the hands of his family and friends, at home. I was met by my wife and two boys, and proceeded to New York and home the same afternoon.

My one great regret was that I had to leave little Sgt. Alex in the Pacific. But I am sure he, too, is among friends—and at home.

## News of the Society

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sion; the use of a smaller displacement engine and a supercharger for obtaining the maximum power output; streamlining to reduce the power required to propel the vehicle at a given speed.

In the discussion which followed presentation of the papers, S. B. Shaw, Pacific Gas & Electric Co., gave a set of specifications which he believes represent the post-war automobile. This car would be a light-weight, high-compression ratio automobile, having a displacement of approximately 130 cu in., hydraulic transmission, and composed primarily of lightweight alloys and plastics. Another discusser expressed the opinion that, contrary to the general thought, the future car will be bigger and more powerful since the construction of super, high-speed highways will produce a definite need for this type of car.

## Maximum Production Is Aim Of War Production Conference

ANSWERING questions on procedure and policy of ordnance inspection, asked at a New York War Production Conference on Jan. 7, Col. Robert W. Johnson, district chief, New York Ordnance District, said the Ordnance Department is attempting to cut down the man-hours devoted to inspection of work in process, and at the same time tighten up on end product inspection. Improved quality is not necessarily achieved as a result of multiplying inspection, he averred. For example, he cited a case where an over-amount of inspection actually resulted in the production of a high percentage of rejects simply because the workers felt that if the parts were turned out hurriedly and inaccurately, the inspectors would catch them anyway.

The Metropolitan Section of the SAE was one of a group of leading engineering societies under whose auspices the conference was developed. SAE arrangements for participation were handled by Herbert Happenberg, chairman of the Section. The program was dedicated to the interchange of ideas and results in order to obtain the maximum production while practicing the ultimate economy in materials, in manpower, and in the use of facilities.

In answer to a question from the floor, Col. Johnson said that management has not tried to duck Government inspection, but is accepting it as a part of the whole ordnance production program. The Government is now questioning its own methods rather than those of industry. He expressed an open mind on many questions asked of him, and frankly sought the opinions of men in industry.

Several speakers suggested that since the most important factor involved was the end use of the product, it would be highly desirable that chief inspectors and other responsible officials be given an opportunity to see ordnance materiel being assembled at the arsenals and even tested at the proving ground.

As for inspection of end products rather than inspection of components, it was brought out by one speaker that this was a satisfactory arrangement, provided the as-

sembly is made all in one plant. If two parts of a fuse, for example, fit together in assembly, there is no need to inspect the screw threads of either. On the other hand, if the two components are assembled at a later point with a part made elsewhere, it is necessary to inspect each component separately.

## Planes Surprisingly Versatile In Spite of Specialty Design

■ Philadelphia

"**A**LL airplane design is a compromise," stated Major Nathaniel F. Silsbee, U. S. Army Air Corps, in a talk before the Philadelphia Section meeting of Jan. 13 which reemphasized many points developed in his paper which was presented in the November *SAE Journal*.

"Each desirable quality in performance calls for a certain property," he continued, "and the various properties conflict to a remarkable degree." Thus there must be many types of planes, each built to do its specific job as best it can. There are medium altitude and high altitude fighters, and recently specially designed night fighters. There are mine layers, coastal patrol planes, carrier based planes, transport and cargo planes, the latter supplemented by gliders.

"In spite of this fundamental doctrine of design," he explained, "it is surprising what can be done with a single plane when it is necessary." The original Douglas (A-20) attack bomber, for example, has done more than 15 different jobs with only minor alterations. It has been an attack bomber, a day fighter, a night fighter, a night and day bomber, and a dive bomber. The British Hurricane has been, among other things, a light bomber and a long-range fighter, and has been used to a certain extent from catapults on merchant marine ships. These Douglas Bostons, Hurricanes and Curtiss P-40E's were in large part responsible for stopping Rommel before Alexandria in the fall of 1942, he reported.

The three basic prerequisites for an effective air power were next outlined by Major Silsbee. First, there must be a balanced air force; there must be the right number of the right kind of planes in each theater of war. Secondly, there must be a sufficient number of well-trained personnel. The third prerequisite is a competent and effective air transport system.

Major Silsbee closed his paper with a series of colored slides showing modern U. S. military planes.

## Lubricant Simplification Will Reduce Mistakes

■ Mohawk-Hudson Group

"The two factors affecting cold weather starting are oil viscosity at the temperature, and battery condition," pointed out J. W. Lane, automotive engineer, Socony-Vacuum Oil Co., in a talk before the Jan. 19 meeting of the Mohawk-Hudson Group. H. L. Hemingway, lubrication engineer, Kendall Refining Co., spoke on the same topic.

Mr. Lane's illustrated talk on the application of heavy-duty oils and universal-type gear lubricant emphasized the cold weather side of the picture. "As far as oil is concerned, the chief point to be considered is its viscosity at the temperature at which the

start is to be made, and not its pour point," he said. "However," he added, "the pour point is a factor influencing circulation of the oil when cold." Mr. Lane pointed out that the Army's method of diluting motor oil with gasoline when in very cold climates has considerable advantage over the use of kerosene, since a smaller amount will do a much better job of thinning the oil for low temperature starting, and when the engine gets hot, the gasoline is more readily driven off to give better viscosity at high temperatures.

Points to be considered for the protection of the engine by the motor oil once the engine is started were enumerated by Mr. Lane, and among these were viscosity at operating temperature, oiliness, behavior under extreme pressure, and resistance to acid.

Mr. Hemingway emphasized that simplification is of special importance, because a good deal of lubrication work is done at night, and with fewer types of greases the chance of getting the wrong kind for a certain part of the vehicle is reduced. In developing a universal lubricant, the problem is to get one adequate for all types of service from lightest to heaviest, and both heat and water resistant.

Mr. Hemingway described the different types of sludge encountered in motor oils, and demonstrated with lantern slides the properties which motor oils must possess to pass the Caterpillar Series of test, the Chevrolet, and GM Series 71 Diesel test. He pointed out that the Army requires heavy-duty oils to pass tests both for stability on the piston, covered by the Caterpillar tests, and crankcase stability, emphasized in the Chevrolet and GM series 71 tests.

## SAE Coming Events

### April 8-9

#### SAE National Aeronautic Meeting Hotel New Yorker - New York City

### June 2-3

#### Diesel Engine and Fuels & Lubricants Meeting

(*Auspices of Diesel Engine Activity and Fuels & Lubricants Activity and Cleveland Section*).

#### Hotel Carter - Cleveland, Ohio

### May 5-6

#### SAE National Transportation & Maintenance Meeting

#### Hotel Pennsylvania - New York

### Baltimore - March 11

Engineers Club; dinner 6:30 p.m. "They Are Dependable" - Dr. Robert V. Yohe, technical superintendent, Chemical Division, B. F. Goodrich Co.

### Buffalo - March 10

Hotel Markeen; dinner 6:30 p.m. Organization and Procedures for Aircraft Research - P. F. Rossmann, assistant to director of Military Engineering, Curtiss-Wright Corp., Development Dept., Research Laboratory, Buffalo.

### Canadian - March 17

Royal York Hotel, Toronto; dinner 7:00 p.m. "Concerning Tanks" - L. H. Middleton, chairman, U. S. Government Industry Integrating Committee on Tanks, and vice-president, Electric Auto-Lite Co.

### Chicago - March 9

Hotel Knickerbocker; dinner 6:45 p.m. Subject: Guiberson Radial Diesel Engine. Speaker to be announced.

### Cleveland - March 8

Cleveland Club; dinner 6:30 p.m. Aluminum Pistons for Aircraft - E. J. Willis and R. G. Anderson, Aluminum Co. of America.

### Colorado Club - March 16

Place to be announced; dinner 6:00 p.m. "Let's Grow" - movie from Department of Agriculture.

### Detroit - March 15

Book-Cadillac Hotel, Detroit, Speaker: William M. Jeffers, director, Office of Rubber Director.

### Metropolitan - March 18

Hotel Edison, New York; dinner 6:30 p.m. Current Tank Design - Lt.-Col. Carl E. Cummings, Ordnance Department.

### Milwaukee - March 5

Milwaukee Athletic Club; dinner 6:30 p.m. Speaker to be announced.

### New England - March 11

Engineers Club, Boston; dinner 6:30 p.m. How the Car Dealer is Faring in Wartime - Frank E. H. Johnson. Rebuilt Units - Eben N. Smith. The Automotive Parts Situation - James F. Wanless.

### Northern California - March 9

Hotel Leamington, Oakland; dinner 7:00 p.m. On the SAE Battlefronts - Mac Short, vice-president, Engineering, Vega Aircraft Corp., and president, SAE.

### Northwest - March 11

Edmond Meany Hotel, Seattle, Wash.; dinner 7:00 p.m. On the SAE Battlefronts - Mac Short, vice-president, Engineering, Vega Aircraft Corp., and president, SAE.

### Oregon - March 12

Benson Hotel, Portland; dinner 6:30 p.m. On the SAE Battlefronts - Mac Short, vice-president, Engineering, Vega Aircraft Corp., and president, SAE.

### Southern California - March 5 and 20

March 5 - Hollywood Roosevelt Hotel, Hollywood; dinner 6:30 p.m. Aeronautical Standards for Victory - J. D. Redding, staff representative, Aeronautical Activities, SAE. Economic Aspects of Aircraft Standards - B. C. Boulton, Lockheed Aircraft Corp.

March 20 - Hollywood Roosevelt Hotel. Social Meeting - Dinner Dance.

# Aluminum For Post-War Cars

by FRANK JARDINE

Aluminum Co. of America

DEFINITE ideas regarding the kind of automobile to build for post-war trade are much harder to find than they were a year ago. Automobile engineers are doing less on post-war cars, and conditions which will affect post-war car designs are becoming more complex.

Approximately a year ago most engineers would insist that post-war cars should look about the same as pre-war cars, be about the same size, better streamlined, much lighter, cheaper, and cost less to operate. Today these same engineers wonder whether it will be possible for the public to buy such a car in large quantities after paying the heavy post-war taxes, plus the tax on the car. The tax the public must pay on an automobile and on gasoline can change the type of car commonly manufactured in this country, as it did in Europe in the past. Consideration should also be given to the type of car to build for export trade inasmuch as these cars will be built for a world market. These questions, and many others which will seriously affect the selling price of the post-war car, are questions which have come up during the past year, and make it exceptionally difficult to form definite plans until some of them are answered.

The amount of real work being done on pleasure cars is surprisingly small and in most plants new car ideas have not been completed on the drawing boards. There is a great deal of discussion going on regarding new designs and new design possibilities. The new designs under discussion are usually quite extreme, and some of them include high-compression-ratio valve-in-the-head motors for high-octane gas, sleeve-valve motors, rotary-valve motors, two-cycle motors, and air-cooled motors. The frameless chassis has some supporters and it is almost certain there will be at least one rear-engine car built and tested. All these ideas and a great many more will receive attention. Many of the ideas will be tested before the final post-war car is ready for the public, but some will never go beyond the design stage. Everything indicates that the decision to make a given type and size of car for the real post-war trade will have to wait until more is known about post-war conditions, and the engineers in charge of this work are less inclined to form definite ideas about post-war cars than they were a year ago.

After the war the first car on the market will enjoy exceptional sales, and manufacturers will do everything possible to get into production as rapidly as possible. If there are any new manufacturers, they will take longer to get into production than old manufacturers, but their car can be entirely new and will compete with the second post-war car, brought out by the old manufacturers. The only company that will have the opportunity to make a new start and use new designs entirely will be a new company starting to manufacture its first model.



Most engineers agree that all post-war cars must be considerably lighter than the same size pre-war car. This reduction in weight will be obtained by the use of, first, lightweight materials; second, improved and more economical design; and third (and only if absolutely necessary) reduction in over-all size.

It will always be easier to sell the public a large car using lightweight material than a smaller car of the same weight made of heavy material. With a high gasoline tax, greater economy than can be obtained by the use of more efficient engines will be required, and light weight will be required to make smaller, more economical engines possible without sacrificing performance.

In order to obtain any real benefit from a weight-reducing program, it would be necessary to make approximately a 30% reduction in weight of standard cars and still retain today's performance. This program would require a completely new design, taking advantage of the fact that the new car will weigh 2100 lb in place of 3000 lb when designing each part to obtain proportionately lighter parts throughout the car. It will mean that very few of the old parts can be used unless they are made lighter or of a lighter material.

There are a number of lightweight materials available such as aluminum, magnesium, plastics, and plywood which can be used, but the use of aluminum in a great many of the metal parts would result in the greatest saving in weight. The use of a pound of aluminum will result in a saving of a pound in weight when the aluminum replaces cast iron. In the average car, 500 lb of aluminum could be used in practical applications to obtain a weight saving of 500 lb. By use of economical design for the steel parts, it should be possible to reduce the weight still further. Having designed the car to weigh 2100 lb instead of 3000 lb, the result should be smaller, lighter parts such as engines, transmissions, axles, brakes, tires, and wheels, which would make a 30% weight reduction practical.

Along with the changes and developments being made in other materials, there have also been many improvements in the available aluminum and aluminum alloys. There will be new and stronger aluminum alloys for highly stressed parts, but parts like cylinder heads, crankcase and cylinder blocks, flywheel housings, and transmission cases, which are usually made of cast iron, can be made of secondary-type alloys. These secondary-type alloys will be very different from the grade of secondary-type alloys used before the war, both in analysis and quality.

The entire secondary aluminum alloy market has changed. Industries using aluminum have learned the advantages of keeping their aluminum scrap clean and free from contamination. This results in a much higher grade secondary alloy with better physical properties.

One of the best units to start reducing in weight is the engine, which contains a number of heavy castings. It should be possible to reduce the weight of the average cast-iron engine from approximately 7.5 lb per hp to 5.2 lb per hp or a total reduction in weight of 200 to 225 lb for an engine used in a conventional 3000-lb car. Practically all this saving would be accomplished by substituting secondary aluminum castings for iron castings. This change should be possible with very little, if any, increase in cost per hp. The cost of secondary aluminum will be low; the fabricating cost of making an aluminum casting should be no greater than the fabricating cost of making the same casting of iron, and the cost of machining the aluminum casting will be less than the cost of machining iron castings. The aluminum engine will require cylinder sleeves and valve seats, but it will be possible to increase the power output of the aluminum engine over the power output of the iron engine, which should more than offset this and any other small extra cost.

There are practically no data on the cost of aluminum castings made in continuous-run production foundries where the production quantities compare with the large production cast-iron foundries, but the operations involved when making both kinds of castings are very similar. The aluminum foundries in operation today are jobbing foundries, and new foundries will have to be built or old ones re-equipped for continuous-run type of work. New smelters will also have to be built to take care of the increase in the secondary aluminum available and required. Any automobile company planning to make aluminum engines would no doubt convert its own cast-iron foundries into aluminum foundries or use the aluminum foundries built for the war effort. The tonnage of aluminum available will justify these changes, and if made, will result in the greatest economy for the car manufacturer.

Figuring the advantages gained by the use of light materials in trucks and buses is very simple arithmetic, especially where reduced vehicle weight means increased payload, which is the most economical way to operate.

One truck operator claims that a reduction of a pound in the weight of a truck traveling 100,000 miles a year is worth one dollar a year to the truck operator. Assuming this to be a fact, reducing weight by use of aluminum pays, and trucks should be made as light as is practical.

Considering the large quantities of all kinds of aluminum that will be available after the war, and the prices at which it will be available, it should be practical to use 500 lb of aluminum in the average pleasure car with very little, if any, increase in cost. This would mean a reduction in car weight of over 500 lb. It should also be practical to reduce the weight of a heavy truck chassis by 1500 lb at a small increase in cost, which would very quickly be written off due to increased earnings.

[This paper was presented at the Jan. 21 meeting of the Metropolitan Section.]

# T-AC

## New Appointments Made By General Christmas

ADDITIONAL organizational appointments by Brig.-Gen. John K. Christmas, assistant chief, Tank-Automotive Center, Ordnance Department, Detroit, including four directors of new product divisions, is designed to speed up the engineering and procurement work.

The appointments:

- Col. W. E. Niles, executive officer of the T-AC;

Product Divisions, within the office of the Assistant Chief, with their directors, each of whom is empowered to act with his full authority:

• **Tanks and Combat Vehicles**, Henry H. Howard, former tractor manufacturing executive and associated with Gen. Christmas for more than a year;

• **Transport Vehicles**, Col. E. S. Van Deusen, regular Army officer formerly with the Quartermaster Corps as automotive engineering officer;

• **Parts & Supplies**, Col. Graeme Howard, former General Motors executive, and an officer during the first World War;

• **Tools & Equipment**, C. B. Smith.

Thus three of the four Product Division chiefs are from industry.

"Each of the directors will concentrate his attention on the range of tank-automotive products defined by his title," Gen. Christmas said.

They will work closely with the five basic functional branches of the Center, as explained in the SAE Journal, December, 1942:

• **Development Branch**, Lt.-Col. Joseph M. Colby, chief;

• **Engineering Branch**, Col. Emerson L. Cummings, chief;

• **Supply Branch**, Col. Paul G. Rutten, chief;

• **Maintenance Branch**, Col. Stewart E. Reimel, chief.

Valerius Kendall, former director of Parts & Supplies, becomes the director of the **Tank-Automotive Industrial Integration Committees**. Mr. Kendall will devote all his time in the work of these committees in carrying out the policy of Major-Gen. Levin H. Campbell, Jr., chief of Ordnance, of "shifting all possible responsibility for ordnance production into the hands of industry," Gen. Christmas said.

Col. Barrett Rogers was promoted from assistant chief of the **Control Branch** to chief. Formerly chief of the Industrial Division, Chicago Ordnance District, Col. Rogers was an executive in industrial management engineering.

Lt.-Col. George E. Levings, a West Point graduate and attorney, is the new chief of the **Administration Branch** of the T-AC.

## New Army-Navy Specifications

Joint Army and Navy Committee on Specifications has been set up by the War and Navy Departments to consolidate specifications.

The joint committee will issue "JAN" specifications for items not covered by the Federal Specifications Board.

They're Saying in Washington...

## Airpower — and Glory

NOTHING in the history of OPM, SPAB, or WPB approaches the significance of the squabble for power — and glory — in the nation's aircraft production program.

Since the days of the National Defense Advisory Commission before May, 1940, the nation's aircraft program has had the serious, although frequently amateurish attention, of the nation's leaders. Few among top ranking professional military leaders believed in its significance in the earlier days. Everyone — even the maiden speechmakers of succeeding Congresses — knew its importance with respect to headlines.

The first, and now the only remaining, arms end-product industry division was the Aircraft Branch of the NDAC and OPM, now the Aircraft Production Division of WPB. Although it never did so, this unit of the war production effort could have boasted of its relatively large number of engineers, its relative freedom from encroachment by other agencies and branches of the war effort.

But the fights carried on by high command for controls have resulted in numerous resignations of important and extremely able engineers, although a few important stalwarts still remain. Only their names on doors, and a good memory, tells one of the sad metamorphosis. Production engineers are scarce in WPB which was set up to control wartime production.

Symptomatic of the fight was the violent squabble between Ferdinand Eberstadt, program vice-chairman of WPB, and his colleague, Charles E. Wilson, vice-chairman of WPB for production. Since the "program" of the WP(roduction)B is production, observers, including Congressional investigators, wondered at the division of authority. And Congressmen are writing their own tickets on investigations upon this division of authority — the catalyst which has kept the war production effort confused since the dual-headed Knudsen-Hillman effort.

What this division of authority amounts to is preserving — and adding — layers of insulation between the civilian and military men who have proved their production management abilities, and the men in final authority. On the one side, theorists in production are urging new appointments of the undefined "strong, tough men." Industry wants to deal with practical men.

So it makes little difference which of any two gladiators win, now that top WPB command realizes that production engineering is engineering, and that some place down in the lower strata of WPB there are still a few good engineers. Gladiatorial contests may be good fun, even if not very clean, in peacetime — but it is hardly an essential occupation when there is a world war of this magnitude to be won or lost. In this case "W" and "E" did not add up to "we".

## Conservation

Although the specific figures are officially "under wraps" because of censorship, censorship permits us of this brief and significant progress report: Strategic materials conservation in this present war effort almost belies belief. It isn't the sort of story that throws newspaper headline writers into paroxysms, but it shows clearly how Army, Navy, and civilian engineers approached a tough job, and did it.

## Machine Tools

Although machine tool production got over its hump last fall, machine tool maintenance has a long way to go to get to anything near its good peacetime level. Reasons:

- Many plants have an unaccustomed number of machine tools, many of which are more complicated than they have been used to. Hence they have not built up crews of maintenance men adequate to keep them maintained.

- Machine tools are being overworked, without realization of the necessity for more maintenance than during normal years.

It is probable, but evidence is still missing, that some manufacturers feel that, because the Government has supplied machine tools, the upkeep isn't management's business.

## Those 13 Babies

Those 13 Regional Offices born to the War Production Board about a year ago are not as healthy as their obstetricians and polyglot parents had hoped. Your reporter finds that decisions cannot be made often enough without recourse to the fountainheads at Washington, and hotels and railroads are still jammed.

Army Ordnance and the Naval Districts are doing better. The Tank-Automotive Center in Detroit has reduced travel among those contractors, for example. But for all intents and purposes WPB is still in Washington in so far as most businessmen are concerned.

## Traffic Accident

Two messengers, each riding a tricycle upon which was mounted a large carrier for mail and messages, collided in the Pentagon Building the other day. With its outside corridor a mile and one-eighth long, and its ten radial corridors, the huge office building is in its final stages of completion. Its 17,500 telephones need more than 100 installers and maintenance men, its switchboard 300 girls. Pentagon gags and stories would already fill a small book.



## Despite Increases, Copper Is Short

Although the good news about increased imports and bigger production rates of copper add up to good news, increased uses are gaining faster than production with little hope for meeting military requirements.

Despite the good news about sweeping conservation measures adopted by the Army and Navy to conserve copper, the upping of end-product estimates keeps the copper outlook dark.

## Victory Grams

SAE REPORT ON ENGINE BEARINGS, DEVELOPED BY SUBCOMMITTEE NO. 3, MAINTENANCE METHODS COORDINATING COMMITTEE, TRANSPORTATION & MAINTENANCE ACTIVITY, HAS BEEN PRINTED FOR WIDE DISTRIBUTION BY OFFICE OF DEFENSE TRANSPORTATION WITH ODT RELEASE NO. 81.

"AUTOMOTIVE MANUFACTURERS HAVE BEEN IN THE LEAD IN INITIATING RENEGOTIATION OF WAR CONTRACTS," SPOKESMAN OF WAR DEPARTMENT SAYS. "INvariably AUTOMOTIVE FACTORIES HAVE ALL COST DATA AT HAND."

MILLION-DOLLAR-AN-HOUR RATE REACHED IN ARMS OUTPUT BY AUTOMOTIVE INDUSTRY ALONE. NEARLY 1000 MANUFACTURING PLANTS IN 31 STATES, PLUS COUNTLESS SMALLER SHOPS, CONSTITUTE WORLD'S LARGEST ARSENAL.

1,500,000TH COPY OF SAE AERONAUTICAL MATERIALS SPECIFICATIONS (AMS) WENT TO FORD MOTOR CO. ON FEB. 4. MORE THAN QUARTER-MILLION DISTRIBUTED LAST MONTH.

PRELIMINARY LEND-LEASE ESTIMATES INDICATE \$1 BILLION A MONTH WILL GO TO OUR ALLIES THIS YEAR AT THE PRESENT LEVEL OF MILITARY OPERATIONS. ONE-THIRD OF AIRPLANES AND TANKS EARMARKED FOR L-L.

DETAILED WPB REPORT SHOWS THAT DETROIT CONTINUES TO LEAD ALL U. S. INDUSTRIAL AREAS IN ARMS PRODUCTION.

DOZENS OF ANTIFREEZES, FOUND BY WPB AND COOPERATING GOVERNMENT AGENCIES TO BE HARMFUL TO RADIATORS, NOW ARE PROHIBITED BY WPB.

NEW NICKELS MINTED BY U. S. CONTAIN NO NI. FORMULA: CU 56, AG 35, MN 9. TONNAGE SAVING OF NI RELATIVELY SMALL, BUT PLAN INDICATES SERIOUSNESS OF THE NATION'S NICKEL SHORTAGE.

ARMY BOUGHT \$500 MILLION WORTH OF SPARE PARTS FOR VEHICLES LAST YEAR, BIG INCREASE PROJECTED FOR 1943.

MEDIUM TANK READY FOR BATTLE HAS TOTAL OF 41,000 PARTS.

ESTIMATE OF 1943 AIRCRAFT PRODUCTION AMOUNTS TO ONE FIGHTING PLANE EVERY FOUR MINUTES.

ALL-TIME MONTHLY RECORD OF PLATE SHIPMENTS REACHED 1,124,118 NET TONS, UP FROM 754,522 IN JANUARY, 1942. CONTINUOUS STRIP MILLS CONVERTED TO PLATE ROLLING PRODUCED 565,893 TONS OF THE TOTAL.

## Conservation Chart Guides Designer To Use of Less Critical Materials

WPB's reorganized Conservation Division has issued a guide for the "down-grading" of brass and bronze castings.

Heavy tonnages of critical materials are required for arms production with the result that the supplies of secondary types of metal are relatively plentiful.

These specifications have been carefully reviewed by the Army, Navy and Federal Specifications Committee, the SAE and

ASTM, as well as large using companies.

Thus the metallurgist has provided the design engineer with a guide to approximately similar materials which might be substituted to save those which are under the ban of conservation and limitation orders.

Complete details are available from Carter S. Cole, chief, Metals Section, Conservation Division, War Production Board, Washington.

DOWN-GRADING CHART FOR BRASS AND BRONZE CASTINGS SHOWING SPECIFICATIONS AND MATERIAL REQUIREMENTS

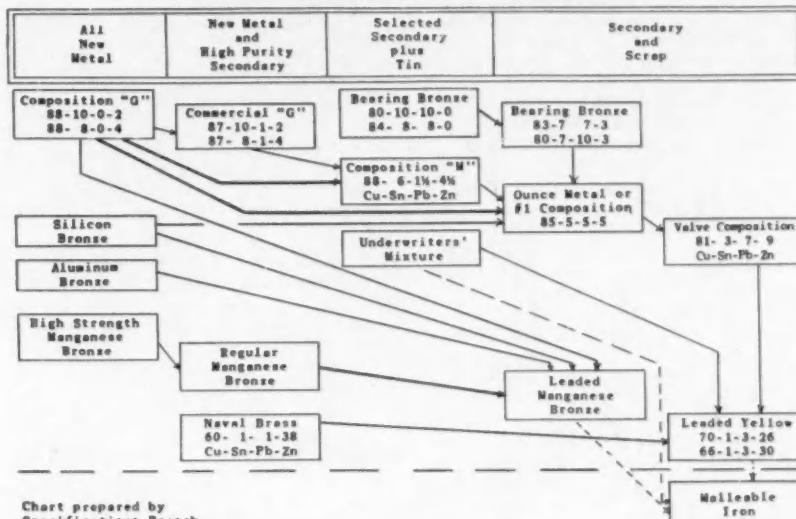


Chart prepared by  
Specifications Branch  
Conservation Div., W.P.B.

SPECIFICATIONS					
ALLOY	ASTM	ARMY & FEDERAL	NAVY	AMS	SAE
Composition "G"	B 143, 1A & 1B B 60	QQ-B-691a-5	46M 6g "G"	4845A	62
Commercial "G"	B 143, 2B E-B 143, 2X	QQ-B-691a-6	46B 5h "P-c"		
Composition "M"	B 143, 2A B 61	QQ-B-691a-1	46B 8g "M"		
85-5-5-5	B 145, 4A B 62	QQ-B-691a-2	46B23c "Oz-c"	40	
81-3-7-9	B 145, 5A	QQ-B-691a-11	46B24d		
80-10-10	B 144, 3A			4842	64
84-8-8	E-B 144, 3Y	QQ-B-691a-8	46B22d "II"		
83-7-7-3	B 144, 3B	QQ-B-691a-12			680
80-7-10-3	E-B 144, 3X				
Naval Brass	B 146, 6C	QQ-B-621-A	46B10f "N-c"		
70-1-3-26	B 146, 6A E-B 146, 6X & 6Y	E-QQ-B-621 X & Y	46B11 (INT)		
66-1-3-30	B 146, 6B	QQ-B-621-B	46B11f (INT)	41	
Silicon Bronze		QQ-C-593	46B28 (INT)		
Aluminum Bronze	B 148, 9A & 9B	QQ-B-671a	46B18c		88
Underwriters' Mixture		WW-C-621a	34F 3c		
H. S. Manganese	B 147, 8B	QQ-B-726b B & C	46B29 "MA-c"	4882	
Regular Manganese	B 147, 8A	QQ-B-726b-A	49B 3e "Mn-c"	4880	43
Leaded Manganese	B 147, 7A	QQ-B-726b-D			

NOTE: Specifications, as shown, are approximately equivalent but may not in all cases be interchangeable for procurement and inspection.

February 1, 1943

# APPLICATIONS Received

The applications for membership received between Jan. 15, 1943, and Feb. 15, 1943, are listed below. The members of the Society are urged to send any pertinent information with regard to those listed which the Council should have for consideration prior to their election. It is requested that such communications from members be sent promptly.

## Baltimore Section

**Bloom, Frederick Kenneth**, senior metallurgist, Rustless Iron & Steel Corp., Baltimore.

**Chambers, George N.**, Capt., U. S. Army, Ordnance Department, Automotive Center, Baltimore.

**Neighbours, H. D.**, partner, Air Brakes & Controls, Baltimore.

**Snyder, Charles Edward**, manager, Snyder Automobile Co., York, Pa.

**Thornton, William C.**, inspector, York Safe & Lock Co., York, Pa.

**White, Claude Carlos**, 1st Lt., U. S. Army, Ordnance Department, Aberdeen Proving Ground, Md.

## Buffalo Section

**Amoroso, John D.**, foundry engineer, Sterling Engine Co., Buffalo.

**Covel, Alson J.**, test engineer, Sterling Engine Co., Buffalo.

**Meredith, Frank Doddridge**, engineering draftsman, Bell Aircraft Corp., Buffalo.

**Smith, Dean Cullen**, director, transport contracts, Curtiss-Wright Corp., Buffalo.

**Suthers, Harold F.**, test engineer, Houde Engineering Division, Houdaille-Hershey Corp., Buffalo.

## Canadian Section

**Auld, Frank M.**, tool designer, Regina Industries, Ltd., Regina, Sask.

**Denny, A. Wallace**, factory manager, Goodyear Tire & Rubber Co. of Can., Ltd., New Toronto, Ont.

**Elcombe, Percy Edgar**, vice-president, partner, Reid-Elcombe, Ltd., Windsor, Ont.

**Hobart, George M.**, general manager, Somerville Limited, London, Ont.

**Kelly, Melville J.**, general manager, Canadian Breweries Transport, Ltd., Toronto, Ont.

**Kinnear, Peter Jack**, industrial service, Imperial Oil Limited, Leaside, Ont.

**McGuire, John C.**, sales manager, Chrysler Corp. of Canada, Ltd., Windsor, Ont.

**McNair, John P.**, vice-president, A. Cross & Co., Ltd., Toronto, Ont.

**Washington, Harold A.**, works manager, Ontario Steel Products Co., Ltd., Oshawa, Ont.

**White, W. H.**, director of sales, Atlas Steel, Ltd., Welland, Ont.

## Chicago Section

**Black, James B.**, engineer, Twin Disc Clutch Co., Rockford, Ill.

**Cloutier, G. Douglas**, chief research engineer, Eversharp, Inc., Chicago.

**Conover, Warren C.**, chief engineer, Johnson Motors, Waukegan, Ill.

**French, Robert P.**, laboratory engineer, Studebaker Corp., South Bend, Ind.

**Krawetz, John**, president, Phoenix Chemical Laboratory, Inc., Chicago.

**Lerrick, Benson Melvin**, general superintendent of maintenance, National City Lines, Inc., Chicago.

**Merriman, Wilfred Dale**, junior mechanical engineer, U. S. Army Air Forces, Buick Motor Division, Melrose Park, Ill.

**Whittemore, Aubrey L.**, owner, A. L. Whittemore, Chicago.

## Cleveland Section

**Allen, John Malone**, student, engineering department, Haverford College, Haverford, Pa., Mail: 2861 Lee Road, Shaker Heights, Ohio.

**Caster, John E.**, district manager, Cincinnati Milling Machine Co., Cincinnati, Ohio. Mail: 94 Euclid Ave., Willoughby, Ohio.

**Cheraso, Charles R.**, draftsman, Pump Engineering Service Corp., Cleveland.

**Christofel, Donald LeRoy**, experimental engineer, The Gabriel Co., Cleveland.

**Clark, Thomas H.**, research engineer, Permold Co., Medina, Ohio.

**Crawford, Marion Browning**, field engineer, Pump Engineering Service Corp., Cleveland.

**Ehlike, Irving C.**, chief tool inspector, Thompson Aircraft Co., Euclid, Ohio.

**Enstrom, Walter E.**, project engineer, The Weldon Tool Co., Cleveland.

**Frischmann, Joseph A.**, chief draftsman, Euclid Road Machinery Co., Euclid, Ohio.

**Harris, Harley W.**, district service manager, Autocar Sales & Service Co., Cleveland.

**Karabinus, Andrew**, general superintendent, Thompson Products, Inc., Cleveland.

**Lafaye, Hilton J., Jr.**, liaison engineer, Goodyear Aircraft Corp., Akron, Ohio.

**Maples, James Whiting**, factory manager, Firestone Tire & Rubber Co., Brentford, England. Mail: Firestone Tire & Rubber Co., Akron, Ohio.

**Martin, Donald H.**, aircraft accessories service manager, Thompson Products, Inc., Cleveland.

**McKeen, Henry Jr.**, mechanical engineer, Timken Roller Bearing Co., Canton, Ohio.

**Monarch Rubber Co.**, Hartville, Ohio.

**Moore, George L.**, engineer, Aluminum Co. of America, Cleveland.

**Read, John W. F.**, production manager, The Babcock & Wilcox Co., Alliance, Ohio.

**St. John, Raymond A.**, field engineer, Heald Machine Co., Worcester, Mass. Mail: 630 Penton Bldg., Cleveland.

**Trainer, James Edward**, vice-president, Firestone Tire & Rubber Co., Akron, Ohio.

**Wingerter, Robert G.**, industrial designing engineer, Timken Roller Bearing Co., Canton, Ohio.

## Detroit Section

**Bachman, Joseph F.**, engineer, Chrysler Corp., Detroit.

**Bagnall, J. Alfred**, field engineer, Spencer Thermostat Co., Attleboro, Mass. Mail: Box 353, Monroe Station, Dearborn, Mich.

**Barnes, Louis E.**, power plant project engineer, Fisher Body Division, General Motors Corp., Detroit.

**Blankenbiller, Henry F.**, sales engineer, Budd Wheel Co., Detroit.

**Bonner, Asa W.**, vice-president and general manager, M. B. Fether Co., chief engineer, Approved Engineering Co., partner and consulting engineer, Approved Mfg. Co., Detroit.

**Boyer, Robert A.**, research department, Ford Motor Co., Dearborn, Mich.

**Broquet, Reginald F.**, research engineer, Ethyl Corp., Detroit.

**Bunting, Bruce R.**, tool designer, Bunting Brass & Bronze Co., Toledo, Ohio.

**Burns, Earl A.**, chief engineer, Woodall Industries, Inc., Detroit.

**Caton, J. Douglas**, assistant chief engineer, Chrysler Corp., Detroit.

**Claes, Edward C.**, assistant chief engineer, Thornton Tandem Co., Detroit.

**Cole, John P.**, superintendent, Universal Products Co., Inc., Dearborn, Mich.

**Collins, Charles Thomas**, service engineer, American Bosch Corp., Detroit.

**Connor, John Edward**, chief aircraft inspector, Motor Products Corp., Detroit.

**Corrado, Vincent Daniel**, layout draftsman, Hudson Motor Car Co., Detroit.

**Degen, Albert W.**, technical service manager, General Motors Truck & Coach Division, General Motors Corp., Pontiac, Mich.

**Dooley, Paul J.**, superintendent, subcontract department, Hinckley-Myers Division, Kent-Moore Organization, Jackson, Mich. Mail: 3434 Drummond Road, Toledo, Ohio.

**Edwards, Franklin W.**, laboratory engineer, Chrysler Corp., Highland Park, Mich.

**Eisengrein, Henry D.**, salesman, expeditor, Ward LaFrance Truck Division, Great American Industries, Inc., Elmira, N. Y. Mail: Book Cadillac Hotel, Detroit.

**Engman, Harry A.**, sales engineer, Long Mfg. Division, Borg-Warner Corp., Detroit.

**Field, Clarke H.**, sales engineer, Aeroquip Corp., Jackson, Mich.

**Galmish, Gilbert L.**, metallurgist, Michigan Malleable Iron Co., Detroit.

**Hagen, Walter J.**, layout draftsman, Chevrolet Motor Division, General Motors Corp., Detroit.

**Hazlewood, Carl N.**, chief engineer, Higgins-Tucker Motor Co., New Orleans, La. Mail: 438 N. Harris Road, Ypsilanti, Mich.

**Hawkins, William M., Jr.**, engineer, Continental Aviation & Engineering Corp., Detroit.

**Johnson, Elmer E.**, test engineer, Detroit Diesel Engine Division, General Motors Corp., Detroit.

**Johnson, John E.**, director, training service, General Motors Corp., Detroit.

**Johnson, Venable Dunnington**, plant engineer, National Stamping Co., Detroit.

**Keller, Harry**, engineer, Buick Motor Division, General Motors Corp., Flint, Mich.

**Lundstrom, Louis C.**, project engineer, General Motors Proving Ground, Milford, Mich.

**Martin, James William**, proprietor, M. B. M. Engineering Co., Detroit.

**Matulaitis, Victor Edward**, engineer, Chrysler Corp., Highland Park, Mich.

**McCann, George Kimberly**, aircraft design, General Motors Corp., Detroit.

**McConnell, William Arthur**, test engineer, General Motors Proving Ground, Milford, Mich.

**Metzel, Harold N.**, experimental development engineer, Oldsmobile Division, General Motors Corp., Lansing, Mich.

**Murphy, Louis N.**, chief engineer, Detroit Special Tires Co., Detroit.

**Myers, Albert F.**, chief engineer, Thornton Tandem Co., Detroit.

**Newman, William George**, designing, Pioneer Engine & Mfg. Co., Detroit.

**Noreyko, Nicholas A.**, designing engineer, Wilcox-Rich Division, Eaton Mfg. Co., Detroit.

**Palmer, William Robert**, draftsman, Chevrolet Motor Division, General Motors Corp., Detroit.

**Patenge, Walter Fred**, vice-president and sales manager, Wohlert Corp., Lansing, Mich.

**Pearce, M. Dwight, Jr.**, assistant purchasing agent, Wayne Division, Bendix Aviation Corp., Wayne, Mich.

**Perkins, Donald C.**, project engineer, Oldsmobile Division, General Motors Corp., Lansing, Mich.

**Peters, William L. F.**, engineer, spring division, Eaton Mfg. Co., Detroit.

**Pfetzing, Henry V.**, tool design draftsman, Hinckley-Myers Division, Kent-Moore Organization, Jackson, Mich.

**Pienkosz, Benjamin**, metallurgist, Aeronautical Products, Inc., Detroit.

**Pinardi, Charles P.**, engineer, Ford Motor Co., Dearborn, Mich.

**Pottinger, Sidney**, experimental test engineer, Continental Motors Corp., Detroit.

**Reynolds, Hubert C.**, Chrysler Corp., Highland Park, Mich.

**Riggs, John D.**, manager, General Motors Corp., Detroit.

**Rinehart, James**, head of planning and scheduling, Hinckley-Myers Division, Kent-Moore Organization, Jackson, Mich.

**Shantz, A. A.**, war products service manager, General Motors Truck & Coach Division, Yellow Truck & Coach Mfg. Co., Pontiac, Mich.

**Smelt, William Leonard**, sales engineer, Approved Engineering Co., Ferndale, Mich.

**Smith, Wendell Sinclair**, field engineer, Gates Rubber Co., Lansing, Mich.

**Smith, William Henry**, production manager, Universal Products Co., Inc., Dearborn, Mich.

**Spohn, Earl M.**, layout draftsman, Budd Wheel Co., Detroit.

**Sprout, Ernest A.**, tool designer, Motor Tool Mfg. Co., Detroit.

**Straesser, Walter Edward**, project engineer, Chrysler Corp., Highland Park, Mich.

**Thomas, G. H.**, assistant sales manager, Long Mfg. Division, Borg-Warner Corp., Detroit.

**Walther, Frederick C.**, production engineering, General Motors Corp., Detroit.

**Wandersee, John F.**, metallurgist, Ford Motor Co., Dearborn, Mich.

**Weiss, Walter L.**, detail engineer, Oldsmobile Division, General Motors Corp., Lansing, Mich.

**Weyburne, Frederic**, manager, production sales, Marshall-Eclipse Division, Bendix Aviation Corp., Detroit.

**Winslow, Richard W.**, mathematician, Continental Aviation & Engineering Corp., Detroit.

**Wright, Walter F.**, chief automotive section, War Production Board, Detroit.

#### Metropolitan Section

**Bailes, C. L. William**, service engineer, The Durham Co., New York City.

**Burford, O. G.**, design engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

**Crawford, Ernest Augustus**, manager of engineering, Sperry Products, Inc., Hoboken, N. J.

**Duffy, Francis P.**, design engineer, Wolverine Motor Works, Inc., Bridgeport, Conn. Mail: 46 Pine Creek Road, Fairfield, Conn.

**Fetherston, W. L.**, district manager, American Bosch Corp., Springfield, Mass. Mail: 1819 Broadway, New York City.

**Fragala, Louis L.**, automotive specialist, U. S. Army, War Department, Brooklyn, N. Y.

**Glasier, Fred C.**, sales manager, Peter Wendel & Sons, Inc., Irvington, N. J.

**Gould, Harry S.**, general executive, Acker-

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man-Gould Co., Brooklyn, N. Y.

**Hammond, Charles W.**, test equipment designer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

**Kirk, Edwin C.**, unit head supervisor, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

**Lehman, Samuel K.**, chief engineer, Union Aircraft Products Corp., New York City.

**Lightbown, Irving E.**, synthetic rubber technician, Stanco Distributors, Inc., division of Standard Oil Co. of N. J., New York City.

**Morrison, William J.**, chief field engineer,

Simmonds Aerocessories, Inc., Long Island City, N. Y.

**McInerney, Henry F., Jr.**, engineering supervisor, Eastern Aircraft Division, General Motors Corp., North Tarrytown, N. Y.

**Nordenholt, George F.**, editor, Product Engineering, McGraw-Hill Publishing Co., New York City.

**Putnam, Gilbert A.**, automotive supervisor, Borden Farm Products, division of The Borden Co., New York City.

**Ringenback, Joseph A.**, estimator, Lawrence Engineering & Research Corp., Linden, N. J.

**Shannon, Leo John**, carburetor test inspec-

tor, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

**Sotak, Paul E.**, tool follow-up, Eastern Aircraft Division, General Motors Corp., North Tarrytown, N. Y.

**Stutson, Alverd Chaney**, staff engineer, Socony-Vacuum Oil Co., Inc., New York City.

#### Indiana Section

**Brennan, Earl William**, president, Reliance Specialty Co., Inc., Indianapolis.

**Gordon, John F.**, assistant to chief engineer, Allison Division, General Motors Corp., Indianapolis.

#### Mid-Continent Section

**Trimble, Harold Millard**, research engineer, Phillips Petroleum Co., Bartlesville, Okla.

**Thompson, W. L.**, chemist, Mid-Continent Petroleum Corp., Tulsa, Okla.

#### Milwaukee Section

**Conn, Edgar L.**, diesel research engineer, Fairbanks, Morse & Co., Beloit, Wis.

**Iverson, George W.**, industrial sales manager, J. I. Case Co., Racine, Wis.

**Mackey, Fred S.**, works manager, Allis-Chalmers Mfg. Co., Milwaukee.

**Schlappman, William J.**, design and development engineer, Young Radiator Co., Racine, Wis.

#### Muskegon Group

**Agerstrand, C. F.**, president, Agerstrand Corp., Muskegon.

#### New England Section

**Kandarian, John**, 1st Lt., U. S. Army, Ordnance Service Command Shop, Fort Devens, Mass.

**O'Donnell, John J.**, Sgt., U. S. Army, Co. C. Hq. Br., O.R.T.C., Aberdeen Proving Ground, Md. Mail: 183 Train St., Dorchester, Mass.

#### Northern California Section

**Durrett, John F.**, principal instructor, Ordnance Auto School, Stockton, Calif.

**Flehardt, Harry**, service mechanic, E. R. Bacon Co., San Francisco.

**Hirvo, Henry Milton**, supervisor and checker, Enterprise Engine Co., San Francisco.

**Moore, Laurence Levern**, factory manager, Winslow Engineering Co., Oakland, Calif.

**Nostrand, William G.**, chief engineer, Winslow Engineering Co., Oakland, Calif.

**Ransford, James A.**, manager, special products sales, Tide Water Associated Oil Co., San Francisco.

**Thale, George A.**, consulting engineer, Hallett Mfg. Co., Inglewood, Calif. Mail: 7 Front St., San Francisco.

#### Northwest Section

**Cook, John W.**, western district service representative, International Harvester Co., Seattle, Wash.

**Dickey, Sterling R.**, foreman, Mt. Rainier Ordnance Motor Base, Tacoma, Wash.

**Jackman, George Albert**, foreman, United Truck Lines, Spokane, Wash.

**Musgrove, James Douglas**, field service engineer, American Bosch Corp., Springfield, Mass. Mail: 3159 E. 84th St., Seattle, Wash.

**Palotay, James L.**, assistant inspector ordnance material, U. S. Army, Ordnance Department, Seattle, Wash.

**Wiberg, Walter R.**, group engineer, Boeing Aircraft Co., Seattle, Wash.

#### Peoria Group

**Bonney, Robert H.**, designer, Caterpillar Tractor Co., Peoria.

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### Philadelphia Section

Benham, Arthur W., Jr., test engineer, Jacobs Aircraft Engine Co., Pottstown, Pa.  
Blackburn, Harry D., foreman, West Philadelphia Buick, Inc., Philadelphia.

Briner, George F., test engineer, Jacobs Aircraft Engine Co., Pottstown, Pa.

Gibson, Albert E., assistant chief draftsman, Turbo Engineering Corp., Trenton, N. J.

Gordon, Haskell R., aeronautical engineer, in charge of experimental structures, Naval Aircraft Factory, Philadelphia.

Riggs, Harold C., electrical engineer, Electric Storage Battery Co., Philadelphia.

Shanley, James J., chief, testing division, New Jersey Department of Motor Vehicles, Trenton, N. J.

Smith, William A., service engineer, Hall Mfg. Co., Toledo, Ohio. Mail: 1823 Widerer Place, Philadelphia.

Wells, George Pennebaker, industrial engineer and estimator, Bendix Aviation Corp., Philadelphia.

### Pittsburgh Section

Brandes, Oliver Leonard, research chemist, Gulf Research & Development Co., Pittsburgh.

Prosser, Edward R., assistant factory manager, American Bantam Car Co., Butler, Pa.

### St. Louis Section

Haller, T. A., experimental engineer, Alis-Chalmers Mfg. Co., Springfield, Ill.

Yust, V. E., research engineer, Shell Oil Co., Wood River, Ill.

### Southern California Section

Berns, Robert M., supervisor, production department, Timm Aircraft Corp., Van Nuys, Calif.

Bobrick, Arthur L., president, Bobrick Mfg. Corp., Los Angeles.

Crossland, John E., drivers coach, Southern California Freight Lines, Los Angeles.

Dillon, John C., assistant supervisor, tool engineering war training, University of California at Los Angeles, Los Angeles.

Dodge, Charles H., junior stress analyst, Vega Aircraft Corp., Burbank, Calif.

Giannini, Gabriel Maria, assistant, office of vice-president, manufacturing, Vega Aircraft Corp., Burbank, Calif.

Gerschler, James M., director of structural research, Lockheed Aircraft Corp., Burbank, Calif.

Goughnour, Charles A., industrial engineer, Union Oil Co. of California, Los Angeles.

Harbers, H. C., chief engineer, Allied Machinery Mfg. Co., Los Angeles.

Hedrick, Frank J., assistant educational supervisor, University of California, War Training, Los Angeles.

Henderson, George E., "B" production engineer, Vega Aircraft Corp., Burbank, Calif.

Hill, Lester R., safety engineer, Miller, Kuhrt & Rosendahl, Los Angeles.

Humphreville, Ralph M., civilian advisor, U. S. Army. Mail: 1213 Carlton Drive, Glendale, Calif.

Juckeland, H. O., service manager, International Harvester Co., Los Angeles.

Kinsel, James L., material checker, Lockheed Aircraft Corp., Burbank, Calif.

Middleton, Ralph E., chief engineer, Aircraft Accessories Corp., Burbank, Calif.

Miles, Kenneth L., staff engineer-training, Vega Aircraft Corp., Burbank, Calif.

Mullgardt, A. S., vice-president and chief engineer, Cherry Rivet Co., Los Angeles.

Olson, Ober B., automotive engineer, Union Oil Co. of California, Los Angeles.

Palmer, Paul M., engineer, Adel Precision Products Corp., Burbank, Calif.

Taaffe, John, automotive adviser, U. S. Army, 46th Armored Medical Battalion, APO 254, c/o Postmaster, Los Angeles.

Wolfe, Thomas, vice-president in charge of traffic, Western Air Lines, Los Angeles.

### Southern New England Section

Buder, Charles Frederick John, service department, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Chandler, Francis C., Capt., U. S. Army, Motor Transport Officer, Providence, R. I. Mail: Sherwood Ave., Bridgeport, Conn.

Jedrzwski, Chester M., assistant project engineer, Hamilton Standard Propellers, division of United Aircraft Corp., East Hartford, Conn.

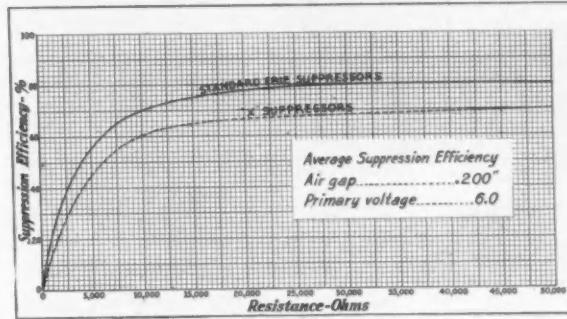
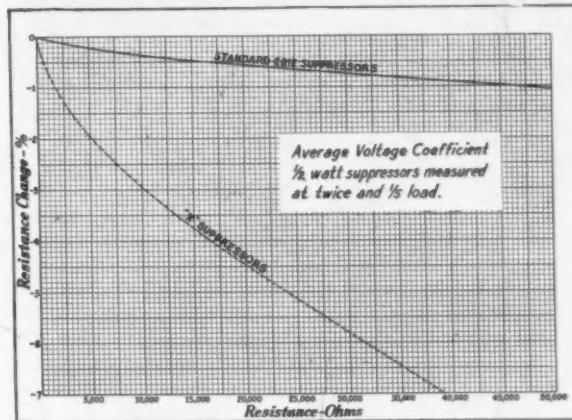
Lamphere, Richard W., development engineer, American Bosch Corp., Springfield, Mass.

Markowski, Stanley J., engineer, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Small, Leslie C., Jr., layout draftsman, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Zimmerman, Charles H., project engineer,

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IT is unnecessary to use excessively high resistance values to obtain adequate suppression, when using Erie Suppressors.

Maximum efficiency is reached at approximately 20,000 ohms, as shown in Figure 2. The dotted line shows results obtained with "X" suppressors having a high voltage coefficient. This type would require the use of 50,000 ohm value to obtain reduction of ignition noise equal to 10,000 ohm Erie Suppressors. Specify Erie Suppressors for efficient elimination of ignition in nearby radio communications equipment.

THE function of an ignition interference suppressor is to cut down the amplitude of the high frequency spark discharge without seriously reducing the energy in the low frequency discharge, necessary for proper ignition. The suppressor must, therefore, maintain substantially constant resistance, during the entire discharge period. Consequently, a low voltage coefficient is required. Figure 1 shows comparison of Erie Suppressors which have a low voltage coefficient, and "X" suppressors having high voltage coefficient.

Laboratory measurements show that

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#### Southern Ohio Section

**Balzhiser, James K.**, junior engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Lockland, Ohio.

**Carson, Howard**, project engineer, Aeroparts Division, General Motors Corp., Dayton, Ohio.

**Johnson, Wesley E.**, 1st Lt., U. S. Army Air Corps, Wright Field, Dayton, Ohio.

**Keiper, Edwin E.**, diesel engineer, General Machinery Corp., Hamilton, Ohio.

**Kennedy, William R., Jr.**, junior engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Lockland, Ohio.

**Pfeiffer, Paul O.**, assistant experimental engineer, General Tire & Rubber Co., Akron, Ohio.

**Schrick, Karl, Jr.**, layout man, General Machinery Corp., Hamilton, Ohio.

**Tallman, Lawrence Richard**, general foreman, assembly and test inspection, Wright

Aeronautical Corp., division of Curtiss-Wright Corp., Lockland, Ohio.

**Vance, Robert O.**, junior engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Lockland, Ohio.

#### Texas Section

**Burbank, Leland A.**, Lt. Col., U. S. Army, Normoyle Ordnance Depot, San Antonio, Texas.

**Friedmann, Anton R. J.**, assistant director of technical training, U. S. Army Air Corps, Sheppard Field, Texas.

**Hoot, Samuel C.**, general manager and vice-president, Wright Oil Co., San Antonio, Texas.

**May, Leon Stephen**, supervisor of experimental manufacturing, Guiberson Diesel Engine Co., Dallas.

**Powell, Jack M.**, foreman, welding, The Guiberson Corp., Dallas.

**Smith, Howard N.**, account executive, Rogers and Smith, Dallas.

**Taylor, R. G., Jr.**, vice-president, The Guiberson Corp., Dallas.

**Whelan, Harry H.**, owner, H. H. Whelan Co., Dallas.

#### Washington Section

**Bartoo, Edward R.**, assistant electrical engineer, National Advisory Committee for Aeronautics, Langley Field, Va.

**Gaither, Robert F.**, senior engineering draftsman, Naval Ordnance Laboratory, Navy Yard, Washington, D. C.

**Hill, John Fitz**, student, Haverford College, Haverford, Pa. Mail: 3415 Porter St., N. W., Washington, D. C.

**Kinsey, Robert O.**, production analyst, War Production Board, Washington, D. C.

**Muller, J. W.**, special representative, Caterpillar Tractor Co., Washington, D. C.

**O'Neill, E. P.**, engineer, Hyatt Bearings Division, General Motors Corp., Washington, D. C.

#### Wichita Section

**Bales, Harold Jackson**, assistant foreman, tool design department, Wichita Division, Boeing Airplane Co., Wichita.

**Johnson, Harold T.**, manager, aviation division, Martin Senour Co., Chicago, Ill. Mail: 140 Old Manor Road N., Wichita.

**Williams, Larry**, chief inspector, Strickland Aircraft Corp., Topeka, Kansas.

#### Outside of Section Territory

**Anderson, Hans J.**, engineer, Minneapolis Moline Power Implement Co., Minneapolis, Minn.

**Hagebock, A. E.**, president, Frank Founds Corp., Moline, Ill.

**MacKenzie, James T.**, chief metallurgist, American Cast Iron Pipe Co., Birmingham, Ala.

**Roig, Lester C.**, Lt., U. S. Army, Automotive Branch, Fort Bragg, N. C.

**Slama, Anthony J.**, Sgt., U. S. Army, 69th Station Hospital, Madison Barracks, N. Y.

**Swardenski, Walter**, purchasing agent, Caterpillar Military Engine Co., Decatur, Ill.

#### Foreign

**Dyer, Leslie Lewis**, in charge technical department, Humber, Ltd., Coventry, England.

**Hancock, Percival**, plant superintendent, Willoughby Municipal Council, Chatswood, N. S. W., Australia.

**Heilbrunn, Ludwig**, chief designer, Metastik, Ltd., Leicester, England.

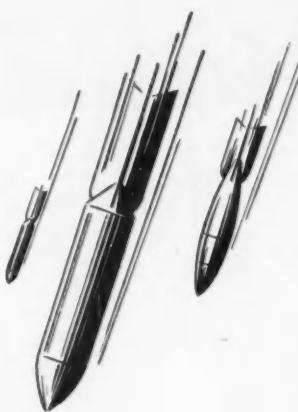
**Kirby, James Norman**, manager, Commonwealth Aircraft Corp., Pty., Ltd., Lidcombe, N.S.W., Australia.

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## News of the Society

continued from page 41

### 1942-43 Section and Group Officers Brought Up to Date

The following list includes all changes which have occurred in the 1942-43 Section and Group officers since a complete list was published in the September SAE Journal:

#### ■ Mid-Continent Section (formerly Southwest Group)

Secretary-Treasurer: Arch L. Foster, associate editor, Petroleum Publishing Co.

#### ■ Milwaukee

Vice-Chairman: Theodore L. Swansen, engineer, Allis-Chalmers Mfg. Co.; secretary: Robert I. Dick, engineer, Murphy Diesel Co.

#### ■ New England

Secretary: W. M. Clark, superintendent of transportation equipment, S. S. Pearce Co.

#### ■ Northern California

Chairman: Dr. Alfred G. Cattaneo, research engineer, Shell Development Co.; vice-chairman Fuels & Lubricants: Grant M. Wheeler, research engineer, Tide Water Associated Oil Co.; treasurer: S. E. Onorato, automotive engineer, Union Oil Co. of Calif.

#### ■ Northwest

Chairman: Lt. Kenneth Ayers, director of maintenance, 13th Naval District, U. S. Navy.

#### ■ Oregon

Chairman: Zenon C. R. Hansen, retail sales manager, International Harvester Co.; vice-chairman: John P. Bourne, superintendent, Standard Oil Co. of Calif.; treasurer: George H. Ohler, president, Automotive Products, Inc.; secretary: James P. Tretton, Jr., superintendent of equipment, Portland Traction Co.

#### ■ St. Louis

Chairman: James Earl Garner, superintendent of transportation equipment, Union Electric Co. of Mo.

#### ■ Southern California

Chairman: Foster M. Gruber, design engineer, Douglas Aircraft Co., Inc.

#### ■ Southern Ohio (formerly Dayton Section)

Chairman: Ernest John Stockum, sales manager, Dayton Malleable Iron Co.

#### ■ Texas

Treasurer: W. G. Fuller, Globe Aircraft Co.; secretary: Edwin H. Jackson, secretary, Globe Aircraft Corp.

#### ■ Washington

Secretary: Major H. R. Higgins, U. S. Army Ordnance Department, Field Service Division.

#### ■ Wichita

Chairman: D. T. Evans, manager, Globe Oil & Refining Co.; vice-chairman: J. J. Clark, Boeing Airplane Co., Wichita Division; secretary-treasurer: Mitchell Zurawinski, design engineer, Cessna Aircraft Co.

Renewed SAE activity in the Wichita area resulted in the reorganization of the Section with new officers, as listed above.

#### New Sections

The Texas Section, formerly the Texas Group, was granted Section status in September, 1942; Mid-Continent Section, formerly the Southwest Group, was granted Section status in January, 1943.

#### New Groups

SAE Muskegon Club held its first meeting in April, 1942; SAE Peoria Group's first meeting was held in October, 1942.



## ON THE ROAD TO TOKYO

**G**IANT ten-wheeled Army trucks are sloshing steadily through the snow, mud and slush of the new Alcan Highway. Their first stop—Alaska!

In at the start of the big push—and on the job under all the varied conditions of this 1,800-mile trek—is the famous "BENDIX" Drive.

Starting something on every front—from Nome to New Guinea, from North Africa to Newfoundland—this reliable starting unit is living up to its record for fast, dependable starts in 60 million peacetime engines. A record which was achieved by the "BENDIX" Drive both as original and replacement units.



ECLIPSE MACHINE DIVISION

#### New Student Branches

Three new SAE Student Branches include Texas A & M College, authorized September, 1942; Oklahoma A & M College, authorized January, 1942; College of the City of New York, authorized November, 1942.

#### Name Changes

The name of the Dayton Section has been changed to Southern Ohio Section, and the Capital Group is now Mohawk-Hudson Group.

# NEW MEMBERS Qualified

These applicants who have qualified for admission to the Society have been welcomed into membership between Jan. 15, 1943, and Feb. 15, 1943.

The various grades of membership are indicated by: (M) Member; (A) Associate Member; (J) Junior; (Aff.) Affiliate Member; (SM) Service Member; (FM) Foreign Member.

#### Baltimore Section

**Carlson, John W.**, Lt. (S M) U. S. Army, Holabird Ordnance Motor Base, Baltimore, Md. (mail) 746 Anneslie Rd.

**Gross, William A., Jr.** (S M) automotive engineer, Automotive Test & Research Division, Aberdeen Proving Ground, Md. (mail) 133 Rigdon Rd., Aberdeen, Md.

**Hammond, Lloyd J.** (A) managing partner, Hammond & Seidel, 1113-1119 Leadenhall St., Baltimore, Md.

**Jarrett, Tracy C.** (M) chief metallurgist, American Hammered Piston Ring Division, Koppers Co., Bush & Hamburg Sts., Baltimore, Md.

**Kerns, Frank Fredrick** (J) test supervisor, Guiberson Diesel Engine Co., 1000 Forest Ave., Garland, Tex. (mail) Carvel Hall Hotel, Annapolis, Md.

**Strobel, Everett H.**, 1st Lt. (S M) proof officer, U. S. Army, Ordnance Department, Aberdeen Proving Ground, Md.

**Theobald, Albert L.** (A) owner, Theobald Automotive Co., 230 W. Chase St., Baltimore, Md.

#### Canadian Section

**Brooks, Kenneth F.** (M) works manager, National Steel Car Corp., Ltd., Malton, Ont., Can. (mail) 10 King Crescent, Weston, Ont., Can.

**LaLonde, Edwin C.** (A) secretary, treasurer, Federal-Mogul Service, Ltd., Toronto, Ont., Can. (mail) 40 Lombard St.

**Skinner, Harold Fred** (J) draftsman, General Motors Products of Canada, Ltd., Oshawa, Ont., Canada (mail) 15 Charles St.

#### Chicago Section

**Balk, Leon J.** (J) engineer, U. S. Army Air Forces, Buick Aircraft Engine Bldg., Melrose Park, Ill. (mail) 126 S. Central Ave., Chicago.

**Bezek, Albert J.** (M) engineer, Bendix Products Corp., South Bend, Ind. (mail) 1658 N. College.

**Borden, Donald A.** (J) production liaison engineer, Bendix Aviation Corp., South Bend, Ind. (mail) 415 E. Broadway.

**Chisholm, James M.** (J) production liaison engineer, Bendix Aviation Corp., South Bend, Ind. (mail) 420 N. Lafayette Blvd.

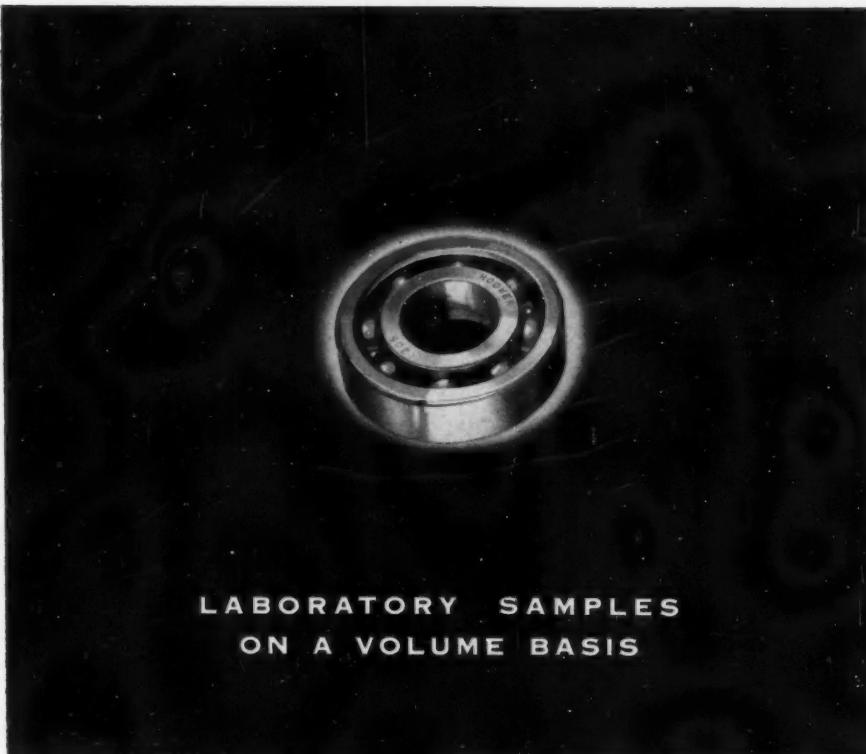
**Christiansen, Edward S.** (A) vice president, Apex Smelting Co., 2537 W. Taylor St., Chicago.

**Davis, Richard A.** (J) assistant engineering laboratory supervisor, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. (mail) R. R. 3, Box 197.

**Eilitz, Arthur H.** (A) war products, service representative, AC Spark Plug Co., Flint, Mich. (mail) 3226 Hartzell St., Evanston, Ill.

**Gill, Joseph H.** (J) production liaison engineer, Bendix Aviation Corp., South Bend, Ind. (mail) 1222 N. Olive St.

**Johnston, Raymond W.** (A) superintendent, maintenance, Suburban Transit System, Inc., 109th & Harlem, Worth, Ill. (mail) 12115 S. 71st Ct., Palos Heights, Ill.



LABORATORY SAMPLES  
ON A VOLUME BASIS

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**HOOVER** *The Aristocrat of Bearings*



**Kingman, David T.** (J) production liaison engineer, Bendix Aviation Corp., South Bend, Ind. (mail) 1602 W. Ewing Ave.

**Knapp, Wallace H.** (J) junior engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

**Krupp, Robert F.** (M) single cylinder project engineer, Dodge Division, Chrysler Bendix Products Division, Bendix Aviation Corp., 7401 S. Cicero, Chicago (mail) 10984 S. Prospect Ave.

**May, Don, Jr.** (J) production liaison engineer, Bendix Aviation Corp., South Bend, Ind. (mail) 2116 S. Taylor.

**Miller, Dorr William** (J) liaison engineer, Bendix Aviation Corp., Ill. Div., Aircraft Carb. Engrg. Dept., 505 N. Sacramento Blvd., Chicago.

**Pence, Harry Henry** (SM) principal automotive adviser, U. S. Army, Plans & Training Branch, Automotive Section G4, Chicago (mail) 8033 S. Perry Ave.

**Wilson, Harold Clifford** (J) aircraft engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. (mail) 1201 Cedar St., Elkhart, Ind.

**Zimmerle, Joseph P.** (M) director of quality, Foote Bros. Gear & Mach. Co., 4545 S. Western Blvd., Chicago (mail) 1737 W. 104th St.

#### Cleveland Section

**Abramoska, Alfred A.** (M) chief engineer, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 7010 Hampstead Ave., Parma, Ohio.

**Adler, Malcolm S.** (A) project engineer, S. K. Wellman Co., 1374 E. 51st St., Cleveland.

**Brash, Frederick L.** (J) layout draftsman, Cleveland Diesel Engine Division, General Motors Corp., 2160 W. 106th St., Cleveland (mail) 12574 Lake Ave., Lakewood, Ohio.

**Brauer, Walter J.** (A) assistant manager, sales order and service department, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 15631 Lakewood Heights Blvd., Lakewood, Ohio.

**Canfield, W. E.** (A) division manager, S. K. Wellman Co., 1374 E. 51st St., Cleveland.

**Courtot, Louis B.** (J) mechanical engineer, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 730 E. 91st St.

**Craig, Charles T.** (A) director of purchases, assistant secretary, Weatherhead Co., 300 E. 131st St., Cleveland.

**Crede, Richard E.** (J) tool engineer, Weatherhead Co., 300 E. 131st St., Cleveland.

**Elcker, Leonard N.** (A) manager, Advance Plating Co., 1947 W. 28th St., Cleveland.

**Gearheart, Don H.** (A) vice-president, general manager, Warren Refining & Chemical Co., 9420 Meech Ave., Cleveland; general manager, Globe Machine & Stamping Co., 1250 W. 76th St., Cleveland (mail) Globe Machine & Stamping Co.

**Hering, Charles Edward** (J) dynamometer engineer, White Motor Co., Dept. 663, 842 E. 79th St., Cleveland.

**Herold, Robert Edward** (J) mechanical engineer, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 1651 E. 93rd St.

**Howard, Wayne R.** (J) test engineer, White Motor Co., Cleveland (mail) R. D. No. 2, Chagrin Falls, Ohio.

**Kelly, John N.** (A) owner, manager, Kelly Plating Co., Cleveland (mail) 10316 Madison Ave.

**Kemble, Edward D.** (M) factory man-

ager, Cleveland Automatic Machine Co., 2269 Ashland, Cleveland (mail) 19925 Laurel Ave., Rocky River, Ohio.

**King, Lewis O.** (J) estimator, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 550 E. 140th St.

**Kristoff, Louis** (J) chief chemist, Natl. Aluminum Cylinder Head Co., 3420 E. 93rd St., Cleveland (mail) 9610 Dickens Ave.

**Lowey, Francis John** (J) project engineer, S. K. Wellman Co., 1374 E. 51st St., Cleveland.

**Mack, Thomas J.** (J) tool designer,

Weatherhead Co., 300 E. 131st St., Cleveland (mail) 4506 W. 42nd St.

**McClain, William S.** (M) methods engineer, Thompson Products, Inc., 2196 Clarkwood Rd., Cleveland (mail) 3810 Westwood Rd., Univ. Heights, Ohio.

**Mlinar, Elmer J.** (A) assistant superintendent, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 3173 W. 139th St.

**Newgren, Elmer A.** (A) chief of time study, Weatherhead Co., 300 E. 131st St., Cleveland (mail) R. D. No. 1, Gates Mills, Ohio.

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**Newmier, Carleton H.** (J) engineering draftsman, Thompson Products, Inc., 2196 Clarkwood Rd., Cleveland (mail) Apt. No. 27, 10912 Carnegie.

**Oberst, Harry E.** (J) draftsman, Pump Engrg. & Service Corp., 12910 Taft Ave., Cleveland (mail) 13714 Chautauqua Ave.

**Orr, Charles Frederick, Jr.** (M) development department, Mansfield Tire & Rubber Co., Mansfield, Ohio.

**Parks, John R.** (M) forging engineer, Weatherhead Co., 300 E. 131st St., Cleveland (mail) R. R. No. 2, Box 174, Chardon, Ohio.

**Phillips, A. W.** (M) general superintendent, tire and track division, B. F. Goodrich Co., Akron, Ohio.

**Phillips, Robert W.** (A) engineer, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 11704 Castlewood Ave.

**Prijatel, Edward A.** (J) draftsman, Pump Engrg. & Service Corp., 12910 Taft Ave., Cleveland (mail) 6725 Edna Ave.

**Rentz, Andrew John** (M) chief inspector, Weatherhead Co., 300 E. 131st St., Cleveland.

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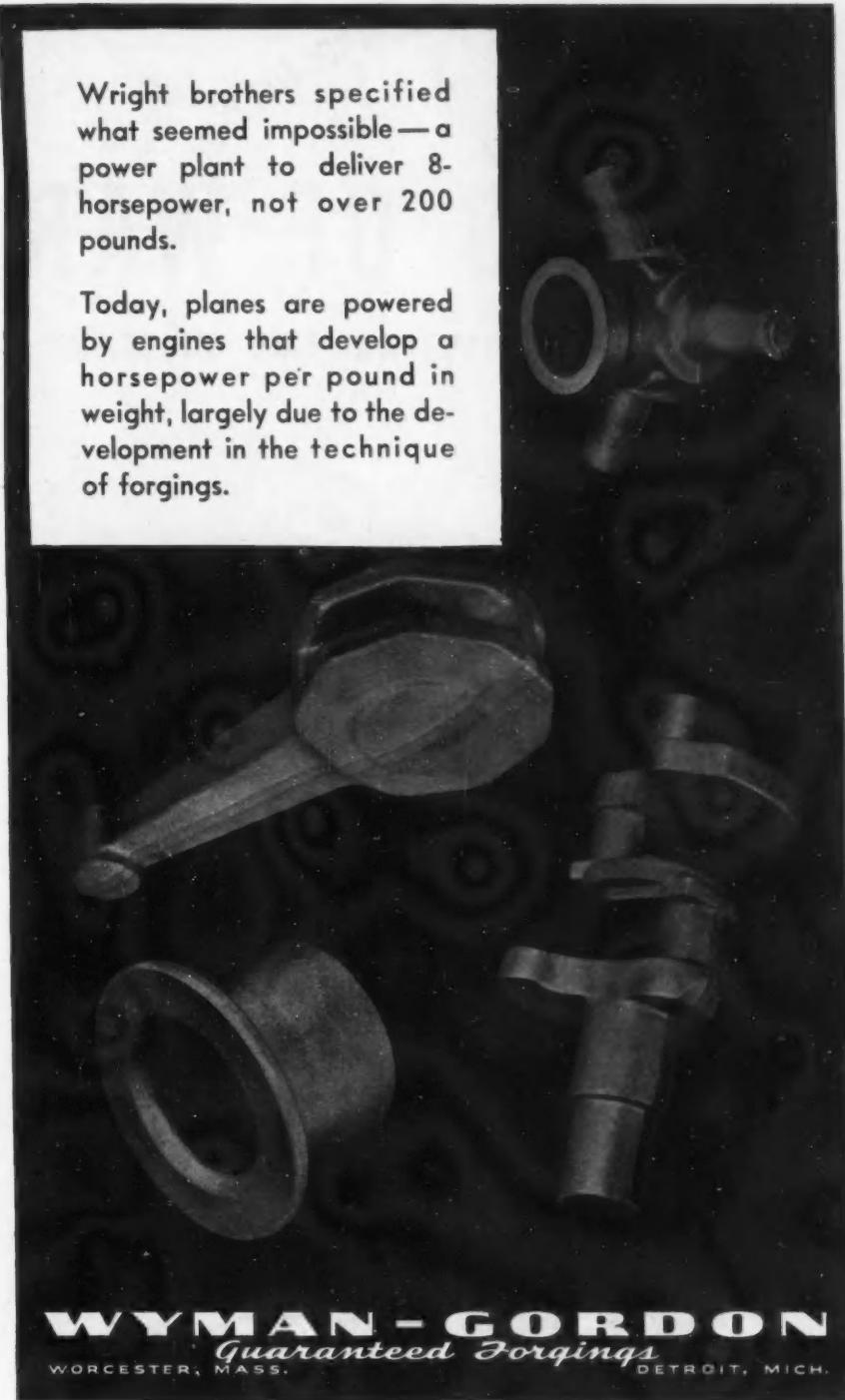
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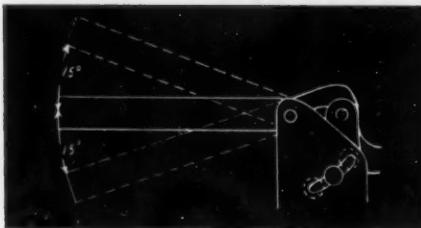
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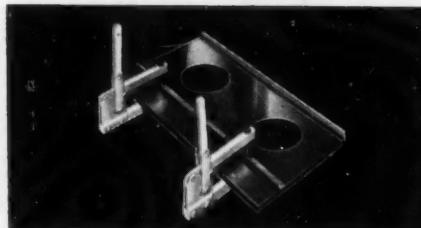
**Thomson, Kenneth John** (F M) managing director, Thomson & Taylor (Brooklands), Ltd., Weybridge, Surrey, England.

**Turner, Luther W.** (A) sales engineer, manager, South American division, Raybestos-Manhattan, Inc., Caixa Postal 193A, Sao Paulo, Brazil.



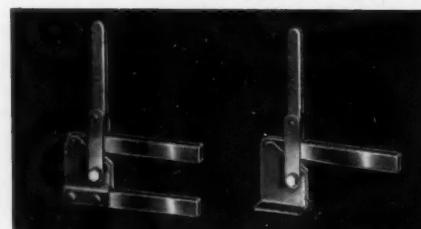
## Infinite Positions

No other clamp is as flexible in its applications... in closed position, the clamping bar has infinite adjustment up to 15° below and above horizontal.



## With PEC Quick Action

Exceptional speed in opening and closing combines with a positive lock that is unaffected by pressure and vibration to provide rapid clamping of any type jig.



## Toggle Clamps

Pec's exclusive self-adjusting feature (which is available on all types of Pec clamps) makes it possible to carry a much smaller stock as one Pec is adjustable to do the work of many ordinary non-adjustable jig clamps.

All clamps are of drop forged construction with case hardened bearing surfaces and sleeves.

Send today (on your firm letterhead, please) for the new 28-page catalog on Pec Jig Clamps, Duplicating Punches, "C" Clamps, Rivet Sets, Dimpling Sets, Scribe Line Duplicators, Inspection and Locating Pins, Dzus Fasteners, and Speedball Drivers.

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